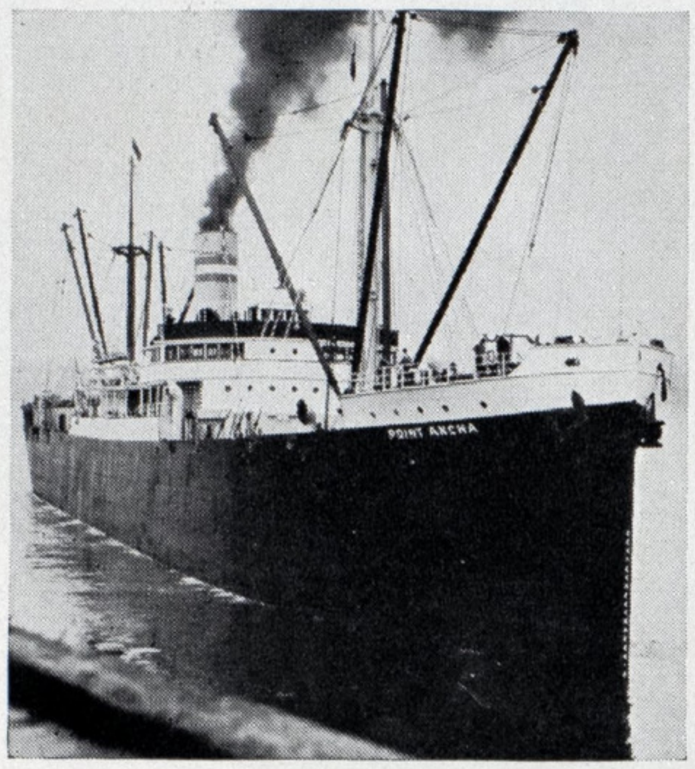
Marine Review

SHIP OPERATION SHIPBUILDING CARGO HANDLING

The National Publication Covering the Business of Transportation by Water

CLEVELAND FOUNDED 1878 NEW YORK



Cleveland Office, Penton Bldg.
A. H. JANSSON, EDITOR
F. V. COLE, BUSINESS MANAGER

New York Office, 220 Broadway
H. A. HILL
B. K. PRICE

Chicago Office, 1118 Peoples Gas Bldg.
L. C. PELOTT
W. G. GUDE

Pittsburgh Office, 1650 Koppers Building
S. H. JASPER
E. A. FRANCE JR.

Washington, D. C. Office, 1050 National Press Building
L. M. LAMM

London Office, Caxton House Westminster, S. W. 1
VINCENT DELPORT

Published monthly by The Penton Publishing Co. Cleveland, Ohio, U. S. A.

CONTENTS

Vol. 65 **June, 1935** *No. 6*

	Page
Editorial	9
Normandie, French Superliner, Enters Service	10
Strathmore, Turbine Liner, India Service	16
Cost Differentials, Operating American Ships By A. H. Jansson	17
Marine Finishes, Protection and Appearance By G. L. Hehl	18
River Towboat, Coiner, Enters Service By H. H. Haas	20
Maritime Law—Late Decisions By Harry Bowne Skillman	24
Ports—Marine Business Statistics Condensed	25
New Construction Ordered and Contemplated	26
Bunker Prices—Domestic and Foreign	27
New Bulkhead System for Oil Tankers By E. C. Kreutzberg	28
High Pressure Boiler, Benson Type	29
Stevedoring and Dock Management Progress Mechanical Equipment for Cargo Handling By G. E. McNamara	30
Useful Hints on Cargo Handling	32
Hospital Ship for St. Johns Guild	33
Up and Down the Great Lakes	34
Champion Coal, River Towboat, Launched	35
Fire Protection, Marine Section Meeting	36
Personal Sketches of Marine Men Henry Smurthwaite, Furness, Withy & Co. By Ben K. Price	37
Studerus, Welded Tanker Launched	38
Equipment Used Afloat and Ashore	40
Hand Propelled Lifeboats for Troop Ship By J. G. Bisset	42
Intercoastal Report Condemns Practices	48

MARINE REVIEW is published monthly on the first of each month by the Penton Publishing Co., Penton Building, Cleveland, O.; JOHN A. PENTON, Chairman of the Board; C. J. STARK, President; J. D. PEASE, Vice President; F. V. COLE, Secretary.

Member, Audit Bureau of Circulations, Associated Business Papers Inc., and National Publishers Association.

Subscription in the United States and its possessions and in Cuba and Mexico, $3 per year; single copies 35 cents, back numbers over three months 50 cents. Subscription in Canada $4 per year; in Great Britain and other foreign countries £1 per year. Cable addresses: Penton, Cleveland, and Irotrapen, London.

Entered in the post office at Cleveland, O., as second class matter under the act of March 3, 1879.

Copyright 1935 by the Penton Publishing Co., Cleveland, O.

Marine Review
FOUNDED 1878
SHIP OPERATION - SHIPBUILDING - CARGO HANDLING
Volume 65 June, 1935 Number 6

The Postmaster General's Mail Contract Report

THE shipping industry of the United States has had to face not only the depression, but continued attacks by government representatives seeking a harmless and at the same time effective political issue. These attacks began with the Black committee investigation and culminated in the recent publication of Postmaster General Farley's report on the mail contracts.

The publication of this report, during the hearings before the senate committee and the approach to an agreement on the form of the shipping legislation proposed by the President, could have but one effect—to discredit the character and ability of American operators.

In finding that 42 out of the 43 mail contracts may be canceled on the basis of noncompliance with some of the terms of the law under which they were drawn, no consideration whatsoever has been given to the good faith, honesty of purpose, and full compliance with all the terms of these contracts by some of the lines. It cannot be denied that a considerable number of first class ships have been built; that they have been operated in strict accordance with the schedules called for; and that these ships have represented the United States in a highly creditable manner.

Though the act of 1928 has not accomplished as much as was expected it has had the effect of adding to the merchant marine 42 modern vessels, comparable in every respect to the latest foreign ships, and 41 reconditioned vessels suitable for service. It has maintained many other vessels in regular services on routes of importance to the trade of this nation. It has so definitely served as the necessary impetus in making a substantial beginning in carrying out the mandate of congress and the will of the American people, that the United States shall take its proper place on the seas in its own foreign trade, that to sweep it all aside now is a destructive move, harmful to the national welfare.

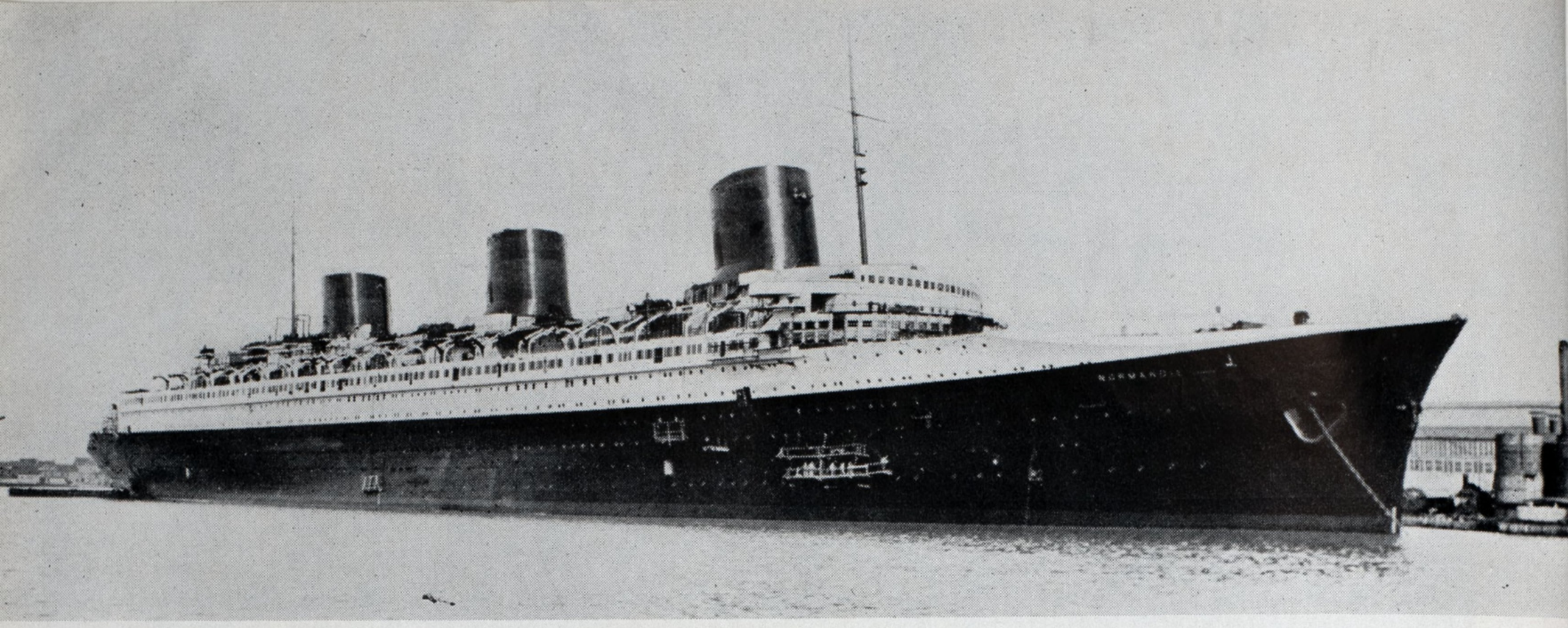
In this sweeping indictment the postmaster general has virtually condemned the entire administration of the 1928 act and the very extent of the indictment is its weakness. Obviously, when the law of the country called for giving aid in support of the merchant marine, it was necessary to deal with established, responsible, experienced companies. Who else was there to deal with in specified trades?.

Under these circumstances, in many instances, there can be little force to the emphasis put on the non-competitive nature of the bids. What would the postmaster general have done had he had the responsibility of taking the necessary action to make the merchant marine act of 1928 operative? His report is clearly affected by political bias.

No doubt some of the contracts were ill-advised and without sufficient guarantee of performance, but there are laws which apply in such cases and there is no reason why action should be delayed in correcting them, and every reason why those who have acted in good faith should be assured of the government's intention to continue to fulfill its part of the contract, or if a new arrangement is to be negotiated that it will be fair to all.

What the merchant marine needs now more than anything else is to have a stop put to these sniping attacks; to give it just a little credit for what has been accomplished; and to carry through promptly the constructive legislation which the President has recommended.

It is fair to assume that the men engaged in the shipping industry in the United States are comparable in character and ability to other Americans and success for the merchant marine is certain if given a decent chance. Let us have co-operation instead of discord, order instead of chaos.



Quadruple screw, turbine electric liner Normandie at the dock of the Penholt Shipyard, March 18, 1935

NORMANDIE,

World's Largest Vessel Enters Service

THE great French liner NORMANDIE is scheduled to dock at a berth expressly built for her and just completed, Pier 88, Hudson river, foot of Forty-eighth street, New York, June 3, after crossing the Atlantic on completion of the first half of her maiden voyage. In this the world's largest and finest, and perhaps fastest, merchant vessel, the naval architect and engineer, the artist and craftsman, have reached a new peak in the steady achievement of man in his age-long struggle to master the sea.

The building of the NORMANDIE has been close to the heart of the French people and the stubborn resolve that no effort or cost should be spared to make her a fitting symbol of national talents and character is not unlike the resolution that saved Verdun.

More than leadership and organization were necessary to produce the NORMANDIE. It could not have been accomplished without master workmen. To these men must go the credit for the perfection of detail and line with which the plans were carried out.

After exhaustive model experiments, beginning in April, 1929 and continuing until March, 1931, in the French naval tank at Grenelle and in the Hamburg tank, the hull form finally decided upon for the NORMANDIE was submitted by Mr. Yourkevitch. This form combines concave lines forward with an inflection point near the waterline, mathematically calculated according to a patented formula. This particular shape at the waterline is combined with a bulb of such proportions that an important reduction of the bow wave is obtained.

Built at St. Nazaire

The NORMANDIE, built by the Penhoet Shipyard, St. Nazaire, for the French line, is a quadruple screw, electrically propelled, luxury liner for the service of the company on its Le Havre-New York route. Construction was decided upon Oct. 29, 1930. The keel was laid Jan. 26, 1931. She was launched Oct. 29, 1932. The weight of the hull at that time was 30,500 tons and the weight of the sliding ways and poppets was 1250 tons.

Capt. Rene Pugnet
Commander of the Normandie

The NORMANDIE began her trials on May 5, 1935 and she was scheduled to sail from Havre to New York on her maiden voyage May 29, 1935. For convenience, the principal characteristics of the NORMANDIE are noted in the accompanying tabulation.

There are eleven decks: sun, embarkation, promenade, main, and A, B, C, D, E, F and G. Five of these decks, A, B, C, D, and E, extend throughout the length of the ship. The two decks below, F and G, are interrupted by the engine and boiler rooms.

Accommodations have been installed for a total of 1972 passengers, divided into the following classes: Grand luxe, 28; luxe, 30; first class, 790; intermediate, 16; tourist, 654; mixed, 139; and third class, 315.

Officers, crew and personnel total 1345, divided as follows: Officers, 66; deck crew, 120; engine room, crew, 187; and civil personnel, 972. The total number of persons, passengers and crew, which can be embarked on the NORMANDIE is, therefore, 3317.

In the hold and 'tween decks a space of 133,295 cubic feet is available for cargo. The capacity of the double bottom compartment and tanks is sufficient for 8930 tons of fuel oil; 6600 tons of fresh water, and 554 tons of salt water.

The under water body, as referred to above, has been designed to give the highest speed with minimum power and fuel consumption and to give good seagoing qualities so that speed may be maintained even in bad weather. The hull is very full amidships and very fine at the ends.

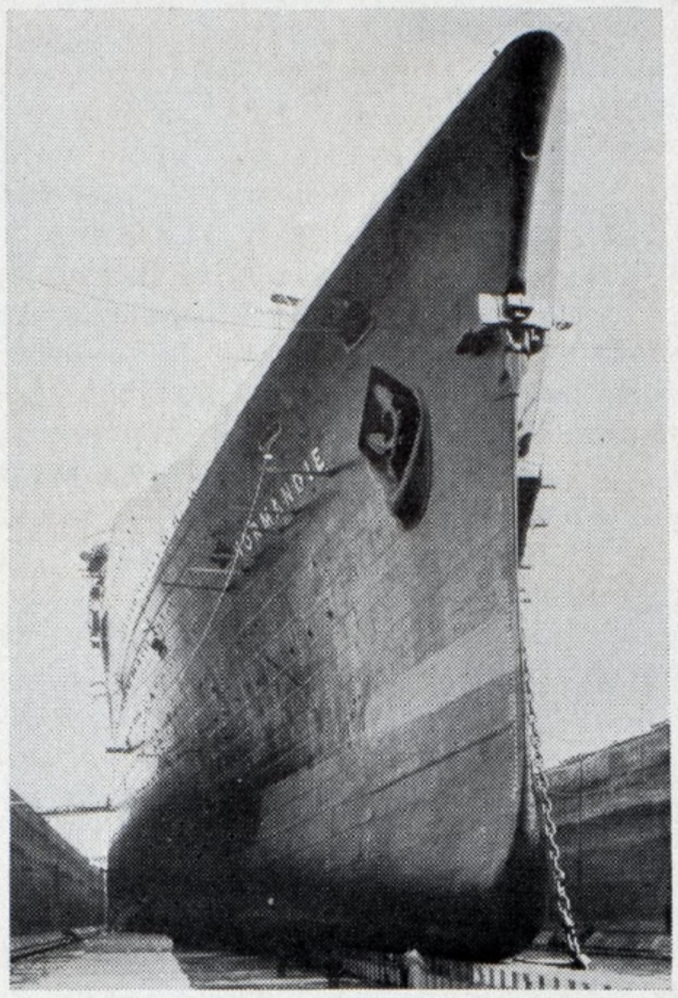
Forward there is a bulb appropriate to her size.

Turtle-back Forward

The above water structure is of inverted arch form at the stern with a good tumblehome amidships and a considerable flare coming forward, finishing with a stem having the profile of a clipper bow with curved sections. The flare in conjunction with the great height of the ship will prevent waves breaking on the promenade deck which ends in a turtle-back. The turtle-back, well cleared of all obstructions, is carried by a strong framing of arch form, and ends at its after part in a breakwater shaped as a cutwater, which will have tendency to deflect seas without damage. The importance of this arrangement is evident in that it will not be necessary to slow down the ship in ordinarily heavy weather.

The central superstructure, including the promenade, boat and sun decks, begins at the after end of the breakwater. Round in form and specially reinforced at its lowest part, in order to stand the impact of the seas, the forward part of the promenade deck is slightly recessed at its upper part, which limits the forward part of the boat deck and sun deck. Here are located the wheel house, chart room, navigation equipment room, captain's quarters, and wireless room. Then come the two forward funnels and the great main lounge dome. The after part includes the engineer's quarters and two suites de luxe.

The open decks are absolutely stripped of the usual gear such as ventilators, air fans, and winches, and thus gives a large area suitable for sports. Aft the various decks end in successive receding stages, beginning with the promenade deck to finish at deck A, the whole forming stepped terraces for the use of passengers of all classes, where they can enjoy the view over the sea in perfect shelter. On the terrace of the main deck an open air swimming pool for tourist class has been installed.



In drydocks, St. Nazaire, March 30

Normandie

Builder	Penhoet Shipyards, St. Nazaire
Launched	Oct. 29, 1932
Trial trip	May 5, 1935
Length overall, feet, inches	1029 0
Length between pp., feet, inches	962 0
Beam at Main Deck, feet, inches	117 9
Beam at Prom. Deck, feet, inches	119 5
Depth molded, Prom. Deck, feet, inches	91 4
Height, keel to top of Chart Room, ft., in.	128 0
Draft loaded, feet, inches	36 7
Displacement, loaded, tons	67,500
Deadweight, tons	12,000
Bunker capacity, cubic feet	338,980
Cargo capacity, cubic feet	133,295
Water ballast capacity, cubic feet	258,356
Gross register, tons (approx.)	79,250
Propelling machinery, turbine electric, four turbine driven a.c. generators, four electric motors, total shaft horsepower, normal	160,000
Boilers, oil burning, watertube	29
Working pressure, lbs. per sq. in.	400
Superheat, degrees Fahr.	680
Passenger capacity, in all classes	1972
Crew, total number	1345
Officers	66
Deck	120
Engine	187
Civil	972
Service, express run	Havre and New York
Speed, crossing	Less than 5 days

Dominating the decks are the funnels, three in number, one of which is a dummy. They are streamlined, their heights decreasing from forward to aft and they are raked ten degrees. The first two have been specially designed to prevent soot falling on the decks. The two pole masts are raked at five degrees, and are placed forward and aft of the funnels.

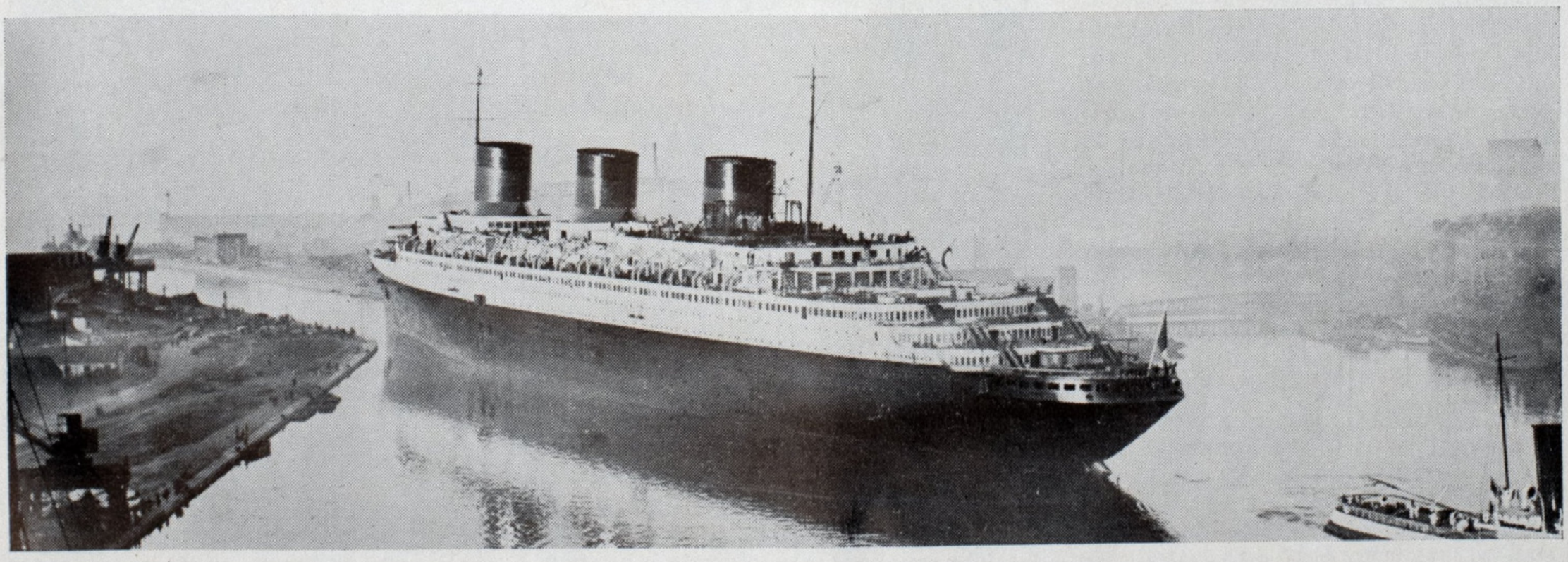
Hull Construction

The Normandie has been built to the rules and under the supervision of the Bureau Veritas, to its highest class, and also in accordance with all the provisions of the international convention for safety at sea, 1929. Passenger, crew and hospital accommodations conform with French, British and American regulations.

The hull, weighing about 30,000 tons, is built of Siemens-Martin steel. Extensive use has been made of high tensile steel, in order to save weight, in all parts of the ship where great strength and rigidity are required, such as bottom plating, tank tops, keelsons, sheer strakes, and main strength decks. No less than 6400 tons of high tensile steel has been used.

The strain on the superstructure has been eased by two expansion joints located at the after part between the boiler hatchways. These hatches located laterally, as are those for the machinery spaces, serve as important vertical stiffeners. The double bottom has been built on the longitudinal system and has four continuous watertight girders between which are intercostal girders with the floor plates continuous between each watertight girder.

The frame spacing, generally 3 feet, is reduced to about 2 feet, 6 inches, in the forward part for three-fifths of the length of the ship, and to 2 feet in the peaks. The shell is clinker built and is fitted with double plates at the forward end in way of the anchors. Bilge keels, 4 feet deep, are fitted on each side of the hull



Normandie leaving dry dock at St. Nazaire, March 31, 1935

for a length of about 207 feet.

The decks are built on the transverse system with the exception of the strength decks, promenade and main decks, which are on the longitudinal system. Except for the open decks, they are flush, with the strakes of deck B and above carried by the under side to give an even floor.

There are four shaft brackets weighing a total of 172 tons. The stem is in three parts, the lower part being of cast steel widened in its middle in order to shape the beginning of the bulb. The weight of this part is 35 tons. The upper part is made of ordinary riveted steel plates. The stern post is of cast steel made in two pieces with a total weight of 102 tons.

The greatest care has been taken in putting these pieces together and in connecting them to the ship's structure to obtain a perfect fit and rigid construction. The stern posts and the shaft brackets were made by the Skoda Steel Works.

Safety of the Ship

The cellular double bottom for water ballast is divided into 40 sections. The double hull which extends throughout the engine and boiler rooms is divided into 62 sections.

In addition to this double bottom and double hull, the vessel is subdivided by 11 main athwartship watertight bulkheads extending to the watertight decks, deck C aft and deck B forward. In these bulkheads are 32 hydraulically operated watertight doors and 29 hand operated doors. For operating these doors there are two pumps, one in service and the other reserved, and also an emergency distant hydraulic equipment with four hand driven pumps supplemented by mechanical apparatus for closing the doors should the piping or machinery be damaged.

Protection against fire is far in excess of the simple requirements of the convention for safety of life at sea. It embodies a net work of bulkheading for confining fire for an appreciable time to the smallest possible space; the use of non-combustible materials; design and lay out of the electric and ventilating systems so that they will not cause or propagate fire; and vigilance in the use and control of detection equipment, with signals centralized in a single room.

For fire fighting, powerful means for extinction can be brought into action rapidly and effectively by a trained, experienced and disciplined personnel. Also, the layout of the entire ship is so that normal life may be continued in the unaffected regions and so that the menaced portions may be kept in use up to the last moment to enable the movement of passengers and help in the extinction of fire. The fire prevention and fire fighting equipment of the NORMANDIE must be studied in detail to be appreciated.

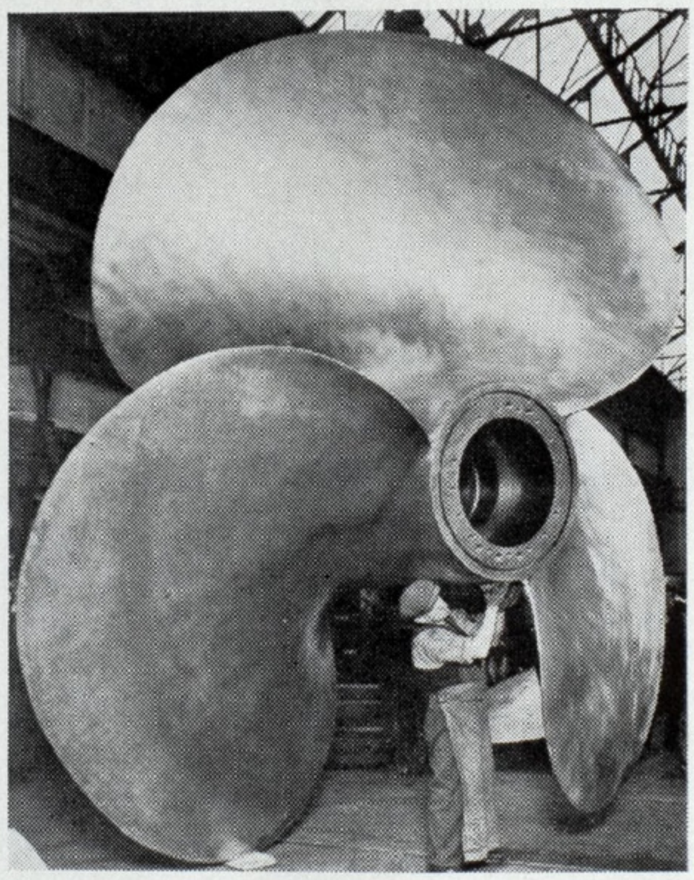
Life Saving Equipment

The NORMANDIE is equipped with 26 lifeboats with a carrying capacity of 88 passengers each; 22 smaller lifeboats with a capacity of 46 each; two motor boats for 32 passengers each and 2 whale boats for 25 persons each. The total carrying capacity of the boats is 3582 persons, or 8 per cent in excess of the total complement of the ship.

All of these boats are built with a double mahogany skin with waterproof fabric between. Of these boats 48 are screw propelled by the Lutatia-Echard system giving them a speed of 3 knots.

The motorboats are fitted with 75 horsepower Baudoin gas-oil engines and have a speed of 9 knots with a radius of 100 miles.

All of the lifeboats are launched by Welin-McLachlan gravity davits, operated by 12 double and 6 single winches driven by 30 horsepower and



One of the four special bronze propellers for the Normandie—nearly 16 feet in diameter, weight 23½ tons

20 horsepower electric motors for the motorboats and lifeboats, respectively.

In addition to the life boats enough floating equipment is provided to accommodate one quarter of the passengers on board.

The NORMANDIE has three permanent anchors, two forward and one aft. The anchors are of the dreadnaught type of forged steel and are housed in the hull. The forward anchors weigh 16 tons and the aft anchor 12 tons. A third spare anchor is carried in a special hawsepipe in the stem. The total weight of the anchor chains is 180 tons. The chains for the forward anchors have a diameter of 4.13 inches and those for the stern anchor a diameter of 3.75 inches.

The anchors are operated by two windlasses forward and one aft, all driven by electric motors. The forward windlasses have a capacity of 100 tons at a speed of about ½-foot per second, and to hold a load of 140 tons, while the after windlass can lift a load of 76 tons at the same speed.

There is only one cargo hatchway and this is served by two electric cranes capable of lifting four tons at 78 feet per minute. Lifting and shifting is done by single unit groups. The lifting group develops 35 horsepower at 450 revolutions per minute, with a speed of 1500 revolutions per minute without load.

There are a total of 23 elevators for passengers and freight, for storerooms and kitchens and for motor cars. Eleven of these elevators are for passengers and 12 are used for carrying provisions, baggage, automobiles, etc. Fifteen of the total number of elevators were manufactured and installed by Otis Pifre, the French affiliate of the Otis Elevator Co., New York.

Ventilation and Heating

With the exception of the first class dining room which is air conditioned, and the engine rooms and boiler rooms, the ventilation of all other quarters of the ship is by one of the following means: low pressure air which can be heated; high pressure with a mixture of hot and cold air; high pressure with hot or cold air; and high pressure with cold air. Low pressure ventilation affected by diffusers and openings, of suitable size to lessen the speed of the air discharged by the apparatus, is in general use in the major first class public rooms. Ventilation of the first class dining room is by means of conditioned air which is delivered by special machinery for washing, cleansing, and giving a required degree of temperature and moisture. For driving this machinery 310 horsepower is necessary.

Needless to say, the NORMANDIE is completely equipped with all types of apparatus for transmitting verbal and written messages. There is a telephone system for passengers and staff, also loud speaking telephones for communication in the navigation and maneuvering of the ship. There is also a pneumatic tube system for the transmission of written messages. A complete system of order transmitters from the bridge to the engine room and other parts of the vessel, electrically operated, is installed. There is also a complete call bell system.

The wireless equipment includes two absolutely separate stations, one at the aft part of the ship and one forward, next to the bridge. The after station is intended for passengers' use and is most complete and modern in every respect. There is also a short wave post for telegraphing only. In addition there is a short wave set for telephoning which con-

nects the ship with the land for all radio telephone communications.

For re-transmitting music and information to passengers, there are 74 loud speakers. In the first class dining room, main lounge, chapel, grill, and theater are loud speakers for broadcasting.

Nautical Equipment

The most up-to-date navigational equipment is installed and includes one Brown gyroscopic compass with seven repeaters, one Carpentier gyroscopic compass with four repeaters, and one Langevin, ultra-sonic depth finder which records automatically the depths of water during the voyage. There is one percussion depth sounder of Marti system and two Kelvin heavy duty depth sounders. Searchlights and part of the steering equipment has been supplied by the Sperry Gyroscope Co.

The main kitchen of the NORMANDIE which groups services of all classes is situated on Deck E and occupies the whole width of the ship and a length of 197 feet. It is most elaborately equipped with all types of modern equipment. There is an electric range, 55 feet, 3 inches long with 17 hot plates and 48 ovens. The steam table as long as the range, has 18 hot water containers and 20 distribution booths. A second steam table of the same length is installed for the use of tourist and third class passengers.

The medical service of the NORMANDIE is most complete and includes a general hospital divided into three sections: a medical surgical clinic; a hospital for the crew; and a hospital for the passengers. All of these are fully equipped according to the highest modern standards.

Propelling Machinery

Turbine electric drive was selected for the NORMANDIE to fulfill the four following requirements: 1. To eliminate vibration or noise. 2. Minimum space and weight without impairing strength and reliability. 3. Low fuel consumption, not only at high speed, but also at lower speed. 4. Maximum power in going astern, for maneuvering purposes.

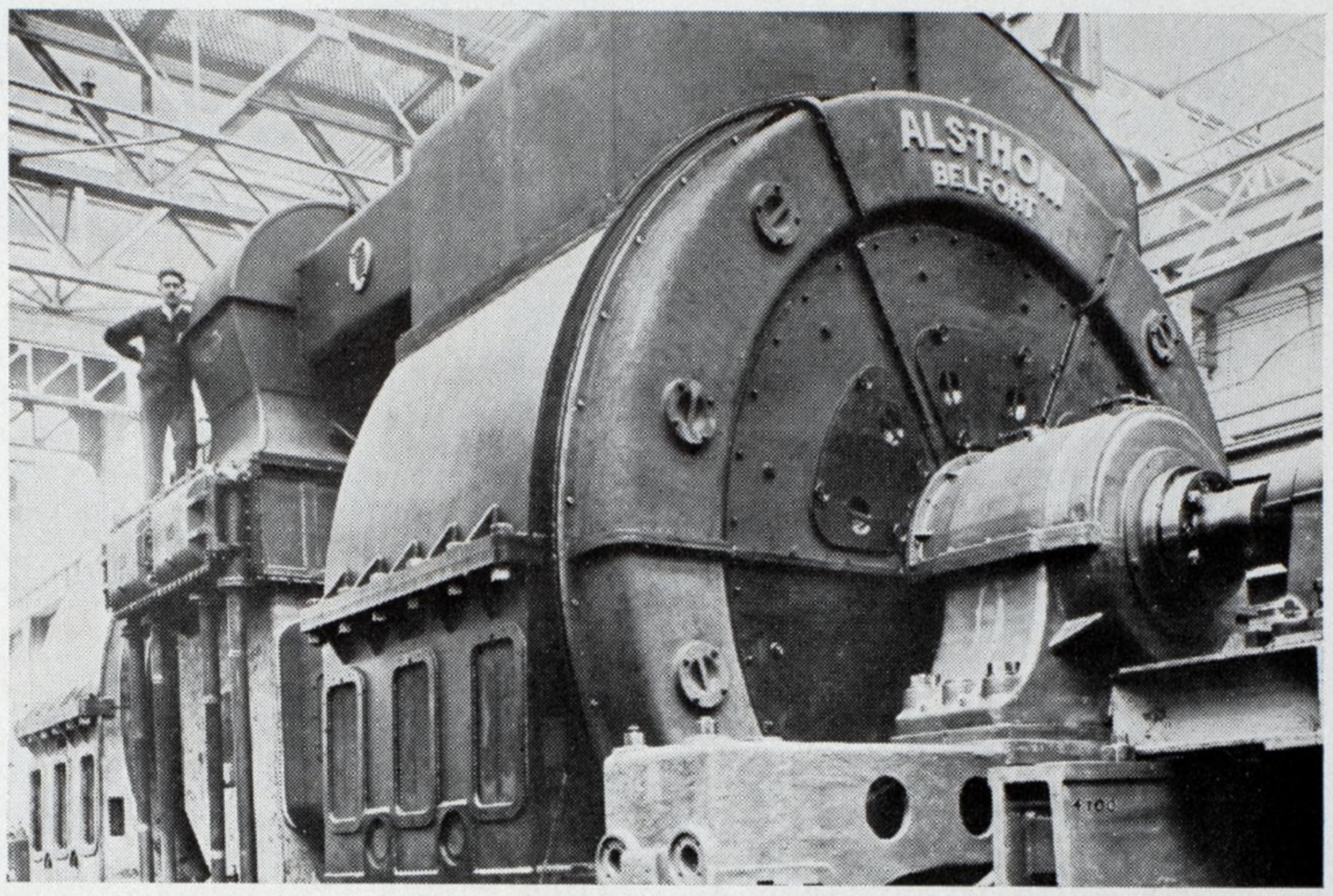
The French designers are satisfied that turbine electric drive meets these requirements in the case of this vessel, everything considered.

Machinery studies were carried out by the Societe' Alsthom, Penhoet Shipyards, and the technical staff of the French line with the collaboration of the General Electric Co. The four turbine generators, four propelling motors, five groups of converters for exciters with all of the auxiliary equipment for the lubricating system, and the entire control and maneuvering gear were built by Ahlstom, at Belfort, France, with American engineers of the General Electric Co. as consultants.

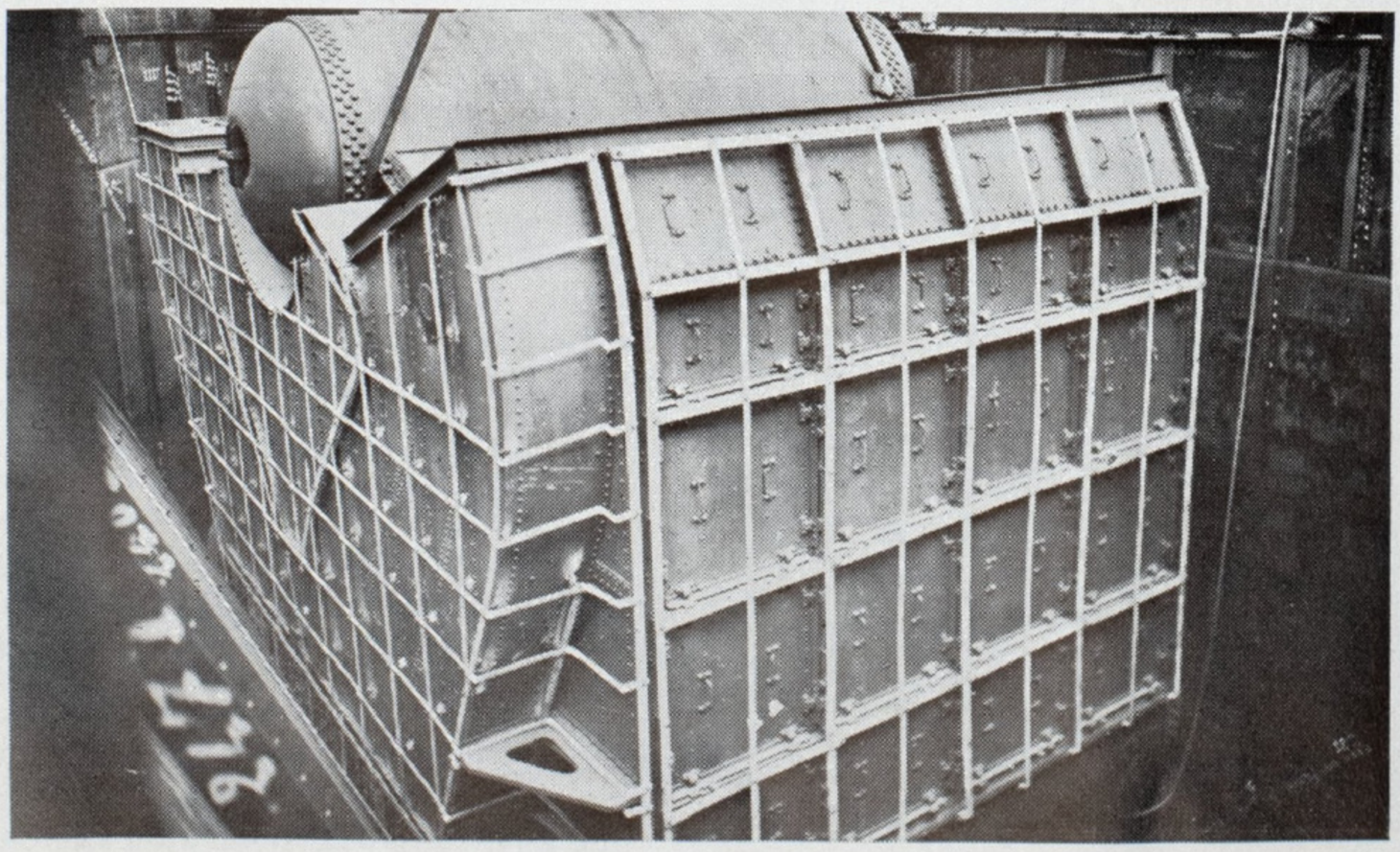
The entire propulsion machinery is contained in six watertight compartments, of these four are used for the steam generating plant and the two others for the propelling and electrical machinery. The maximum output in continuous service will be 160,000 horsepower, equally divided between four shafts.

The propellers are solid three bladed, and are made of a special bronze known as "turbiston." The finished weight of each propeller is 23¼ tons. The diameter is nearly 16 feet and the pitch is variable. Each propeller is so carefully balanced that in the balancing test machine the propeller could be revolved by a slight touch of the finger on the edge of the blade. They were manufactured by J. Stone & Co. Ltd., England.

Steam is supplied to the main turbines and auxiliaries by 29, Penhoet, watertube boilers, operating on a pressure of 400 pounds per square inch and with a superheat of 680 degrees Fahr. There are four cylindrical boilers operating at a pressure of 142½ pounds per square inch. To avoid an elaborate evaporating system, while at the same time supplying the watertube boilers with perfectly pure feed water to eliminate the danger of corrosion, the cylindrical boilers are used to provide steam to the air extractors, the turbine steam chests and water heaters, and the steam, used in this way, after passing through the condensers makes up the losses of the water in the main circuits. In addition to this practical method of supplying pure make-up feed water, there is an auxiliary condenser, preheater station and a small evaporator which can be brought into use when the water is found to be unsuitable for feeding direct to the cylindrical boilers, or in the case of a shortage of fresh water when the evaporators would be fed with sea water.



One of the four propelling motors of the Normandie erected in the shop at Belfort



One of the 29 watertube boilers, erected in the shop

The watertube boilers have three drums, one of large diameter in the upper part and two smaller ones at the lower end. The upper drum is connected to the lower drums by two nests of water tubes and two nests of superheating tubes.

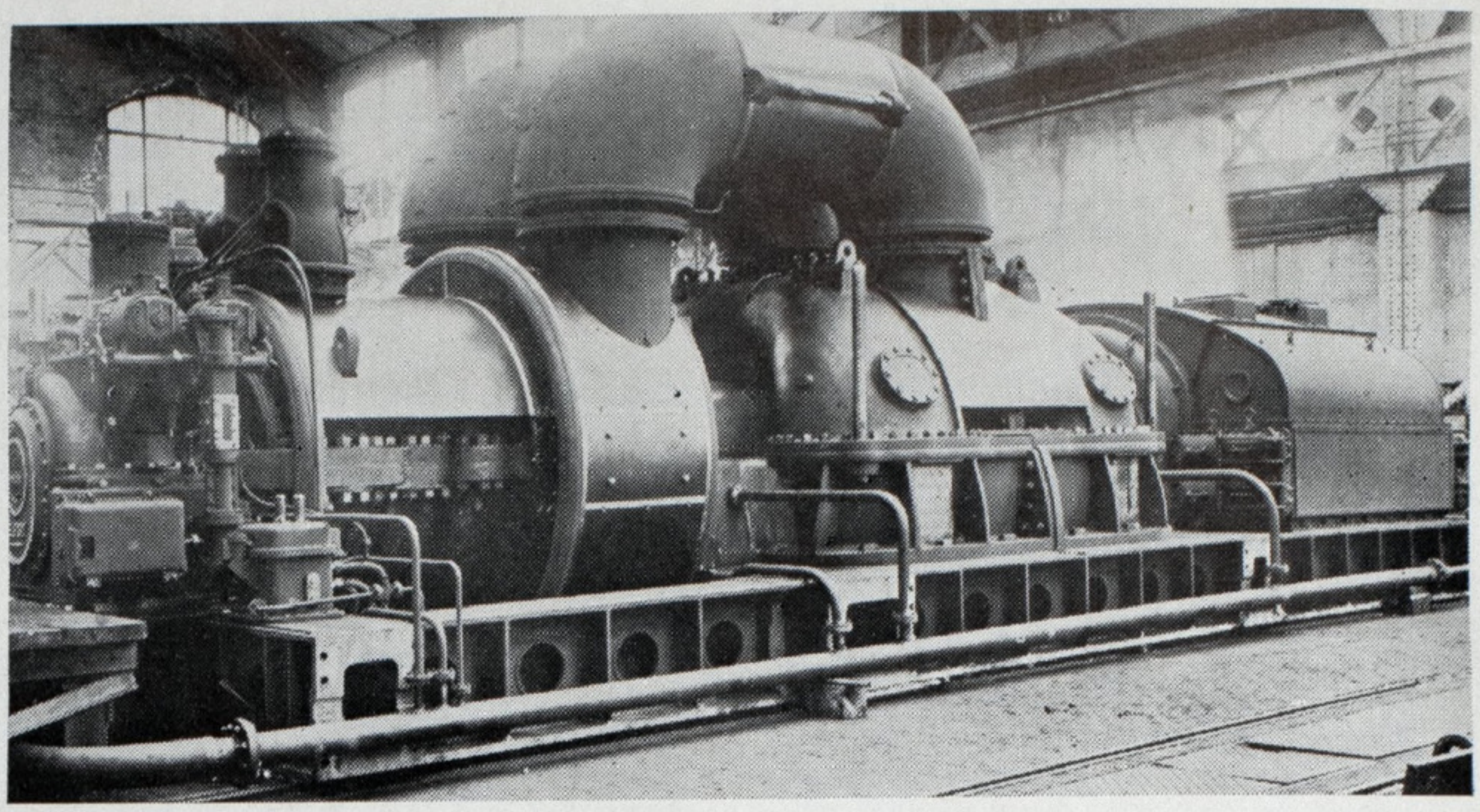
Each boiler is fitted with four oil burners with mechanical pulverization and double air regulation of the Penhoet type. The fuel pumps are electrically driven. Combustion air is fed to the boilers by 21 Howden blowers. With a total output per hour of 40,780,000 cubic feet. These blowers also participate in the ventilation of the boiler rooms.

To insure absolute independence of each of the four groups constituting the propulsion machinery, there are five main superheated steam collectors, four of which are used for each of the turbo generators and the fifth for the auxiliary turbine generators. Cross connections are provided to interconnect these collectors for equalizing the load or to remedy any defect in one of the collectors. To offset stresses from expansion ample use is made of corrugated pipes.

In the boiler rooms there is a complete line of auxiliaries including steam and electrically driven pumps, fuel oil separator, four 75-ton evaporators, one 20-ton condenser distillator, and fire fighting equipment of carbonic foam type. All the flanges of the high pressure piping are screwed in and welded, the joints being made of striated iron rings.

Main Generators, Motors

The propelling machinery consists of four, 3-pole synchronous, alternating current motors, each driving a propeller shaft. Current for these motors is generated by four groups of alternating current turbine driven generators. The motors are independent and cannot be coupled in parallel, but the two motors of the same side can be propelled by either of the two generators of that side, with corresponding limitation in power. Each group of turbine generator and motor is an independent unit with an output of 40,000 horsepower at the propeller, all equipment and connections having been made with this in mind. In normal running condition the connection between the geerator and the motor is synchroncus with a ratio of 10. When starting or reversing the propelling motor runs as a synchronous motor.



One of the four main turbine driven generating sets for the Normandie, as erected in the shop at Belfort

All of the propelling machinery is concentrated in two watertight sections protected by a double skin. The six auxiliary turbine generators, the four groups of main generators and their auxiliaries, the main control station with its switchboard and high tension electrical equipment have been concentrated in the forward compartment. The four propelling motors, the transformer exciters with their equipment, and the thrust blocks of the two outside shafts are in the other compartment immediately aft. The thrust blocks of the two central shafts are in a separate compartment immediately behind.

Each main generator is driven by two turbine shafts, one high pressure and one low pressure, discharging to a condenser located between the bed plates. The maximum speed is 2430 revolutions per minute. A centrifugai speed governor controls the admission of steam, so that they can be regulated with accuracy for all speeds between 500 to 2430 revolutions. Another governor operated by oil pressure controls the speeds between 175 to 500 revolutions per minute.

The propelling motors are rigidly connected to their respective shafts through thrust blocks of Michell type, located between the motor and the shaft. Each motor has 40 poles, 10 more than the generators. The stator is in two pieces, and is made of steel parts electrically welded.

Lubrication of the motor bearings and of the thrust blocks is operated by gravity with two independent circuits, one for each side of the ship. Each circuit is fed by three gear pumps, one of which is in reserve and two oil refrigerators, one of which is also in reserve.

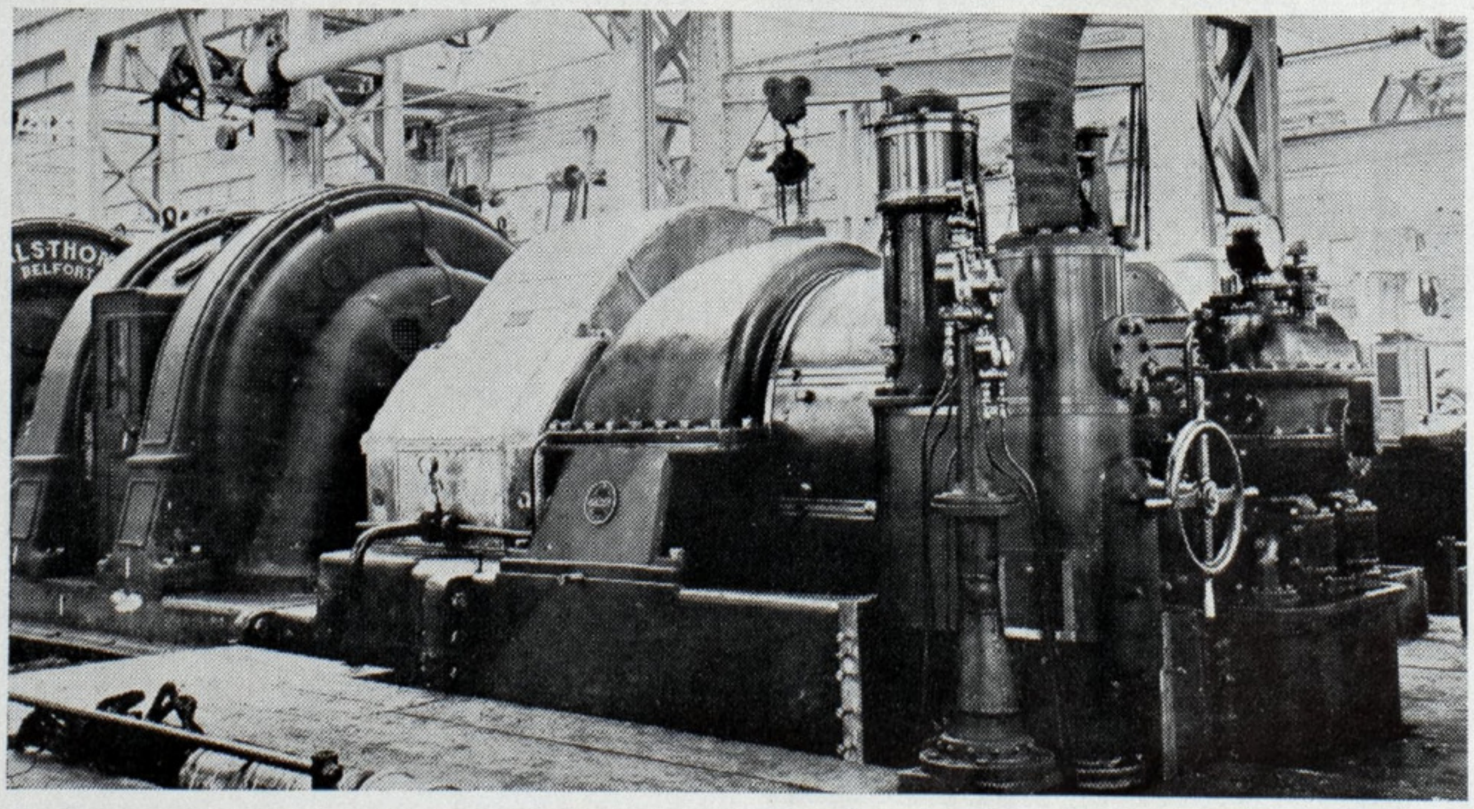
Auxiliary Generators

Excitation of the generators and of the propelling motors is performed by five exciter groups, one being in reserve and the four others each serving one of the shaft units. Each of these groups consist of a direct current electric motor driving two generators, one feeding exciter current to the generator and the other to the motor.

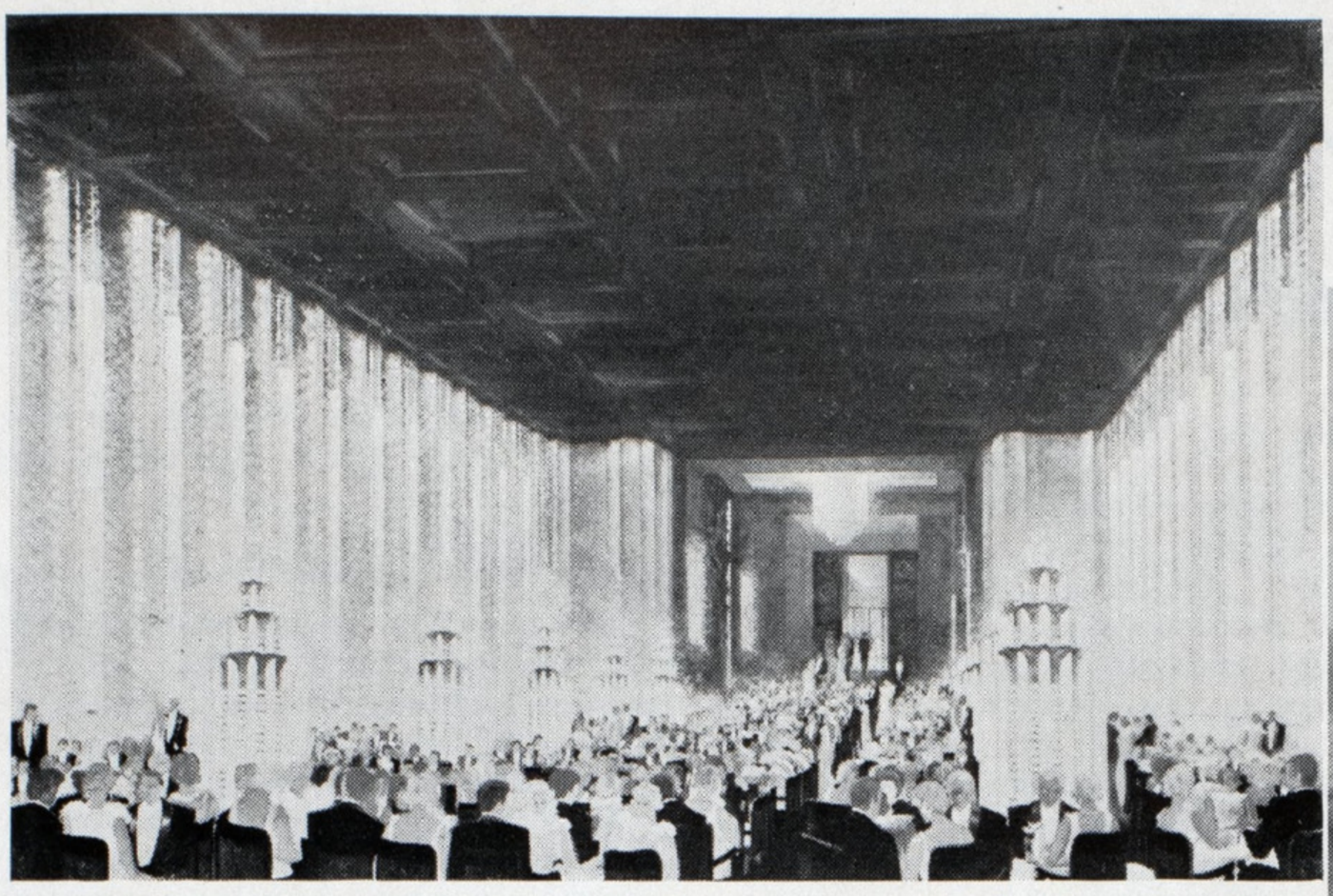
The six auxiliary turbine generators with a capacity of 2200 kilowatts and 220 volts, direct current, supply electricity for the various services of the ship and for the propelling machinery.

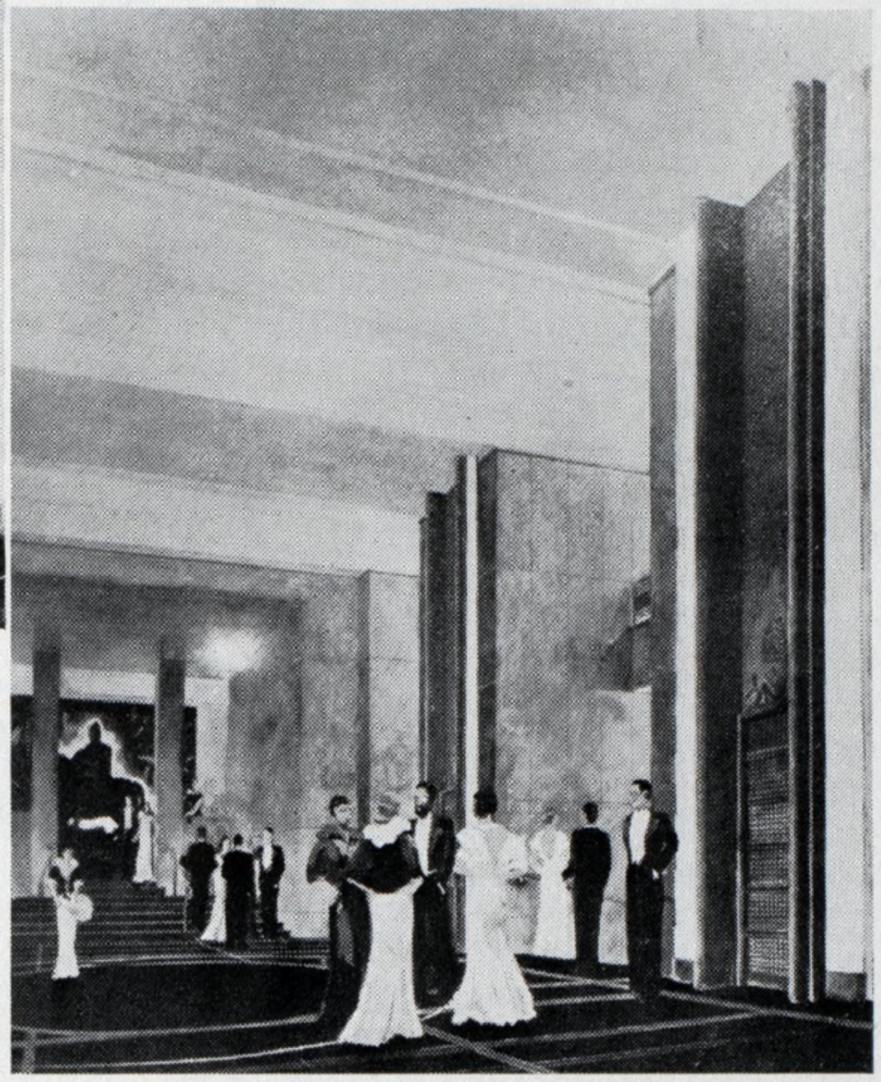
Among additional auxiliaries are four Alfa-Laval, hypercentrifugal separators for purifying the lubricating oil, five 300-ton pumps for sanitary and fire services, two 100-ton pumps for water for toilet purposes, and two 20-ton pumps for drinking water.

The lubricating oil for the NORMANDIE, as for other French line ships, is supplied by an American company, the Socony-Vacuum Oil Co. Inc. The Standard Oil Co. of New



One of the auxiliary turbine driven generating sets





Above — Main dining room of the Normandie. At right—One of the spacious first class halls. Both views are from artist's drawings

Jersey will fuel the NORMANDIE when she arrives in New York. It will require approximately 80,000 barrels of fuel oil for the round voyage across the Atlantic.

Plans for the decoration of the first class public rooms on the NORMANDIE were prepared by four promient French architects, MM. Bouwens de Boijen, Expert, Patout, and Pacon. The group of rooms situated above the promenade deck-main lounge, smoking room, theatre, winter garden, grill room, and different lounges was done by Messrs. Bouwens and Expert. The second group comprising the rooms situated below the promenade deck. main entrance hall, dining room, chapel, swimming pool, and stairway was done by Messrs. Fatout and Pacon.

Passenger Accommodations

The main entrance hall, 70 x 66 feet, three decks high, is located on deck B and is separated from the main dining room by monumental doors in gilt bronze, ornamented with medallions on which are pictures of Normandy towns. The walls are Algerian onxy, set off by hand-wrough copper, gilded and oxydized and by decorations in cast glass.

The chapel, 36 x 24 feet, on C deck, has a central nave in plaster of paris, with indirect lighting and is decorated with paintings.

With walls for the most part of decorated and embossed cast glass panels, the dining room on D deck is the largest public space on the ship. measuring 300 x 43 feet. Eight bronze doors give access to as many small private dining rooms, 15 x 9 feet. The ceiling is done in plaster of paris caisson, treated in gold, with indirect lighting inside. The main lighting consist of 38 luminous glass brackets fixed to the walls, 12 enormous interior lighted glass vases, and two large chandeliers.

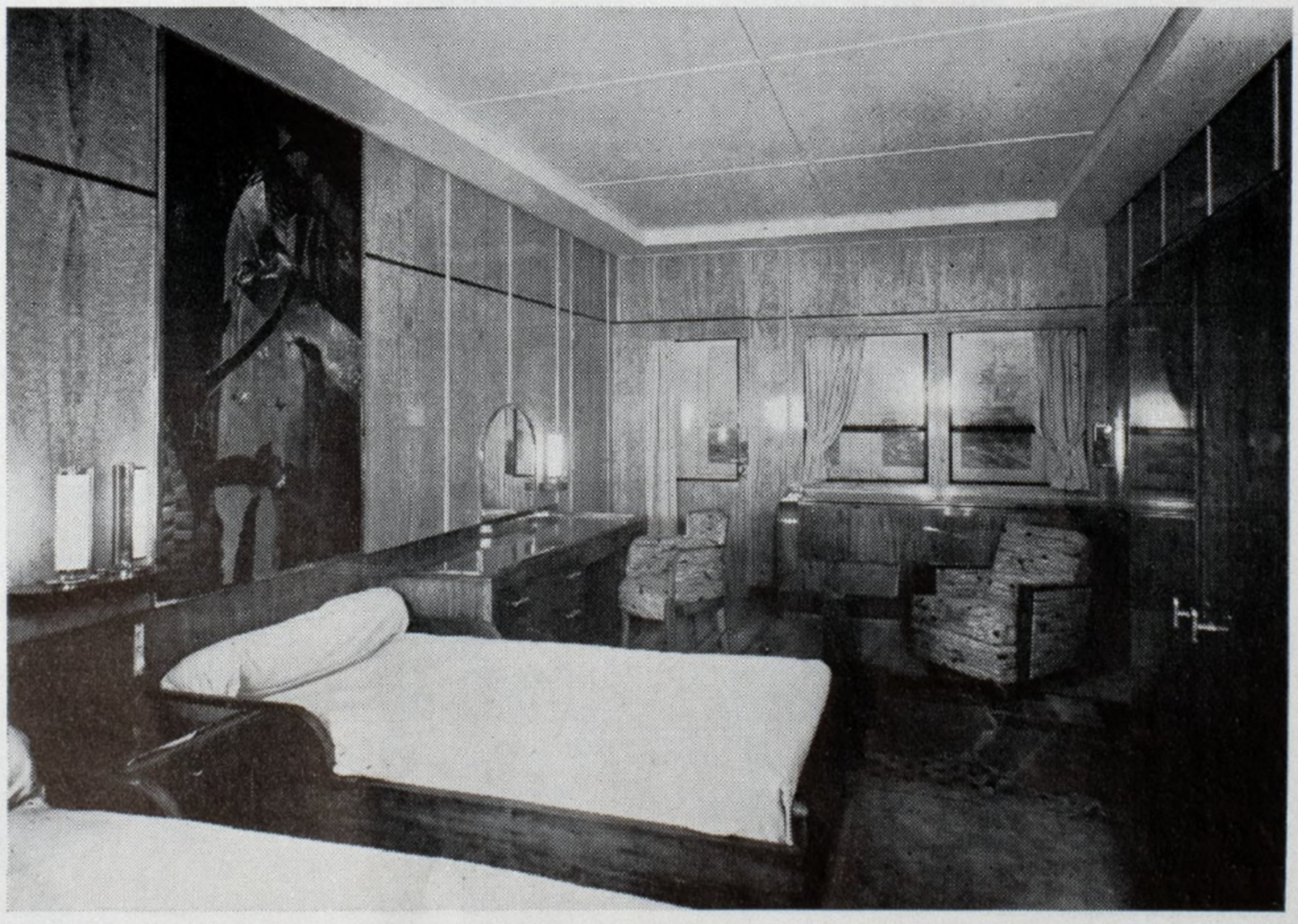
A second dining room, smaller in size and less lofty is located in the after part of the main dining room and may be shut off from it by sliding doors in guilt bronze.

Swimming Pool

Access to the main hall is provided by four stair cases and four lifts, which connect all of the decks between the promenade and D decks where the swimming pool is located. The swimming pool is 75 x 18 feet and is surrounded by a raised platform 4 feet wide. A gymnasium, 30 x 42 feet, and a bar are located at the after end of the swimming pool. The walls, ceiling, and floor of the swimming pool are tiled in pale blue, enameled sandstone. Around the walls to a height of about 4½ feet is a decorative frieze. The lighting is diffused and an ornamental bronze apparatus throws light on the ceiling.

Staircase and lifts from the main hall lead to the upper hall on the promenade deck, on the after part of which is the information bureau and forward the Bon Marche store, display windows, book shop, florist, hairdresser and beauty parlor.

(*Continued on Page* 44)



A typical double first class cabin on the Normandie

STRATHMORE,

Fast Turbine Liner for Service to India

THE STRATHMORE, a twin-screw turbine driven vessel intended primarily for the Peninsular & Oriental Steam Navigation Co.'s express service between the United Kingdom and Bombay, is under construction by Vickers-Armstrongs, Ltd., Barrow, England, and is expected to be in commission early in the autumn of the present year.

The vessel is built to the highest class in Lloyds and conforms to the rules of the international convention. Of dignified external appearance, with graceful lines, straight stem and cruiser stern, the ship has one funnel, of imposing dimensions, and two masts. She will be the largest ship laid down for the P. & O. during the hundred years since the company was founded and will be the largest and fastest vessel ever built for the Europe-India service.

Hull General Arrangements

The ship is subdivided into twelve transverse water tight compartments up to the level of F deck. She has a continuous double bottom and is divided transversely and longitudinally into a large number of tanks for fresh water, boiler feed water, water ballast and oil fuel. From the forward cross oil-fuel bunker to the after end of the engine room, there is a complete double skin up to the waterline.

The general dimensions are: Length between perpendiculars, 630 feet; length overall, 665 feet; breadth molded, 82 feet; breadth overall, 84 feet; depth molded to F deck, 38 feet; depth molded to E deck, 47.5 feet.

Her gross tonnage will be about 24,000, her turbines will develop 24,000 horse power, and the total complement of her crew will comprise 510 persons. She has eight decks, A to H, including the promenade deck, all intended for the use of passengers.

First Class Accommodation

Two viceregal suites, comprising dining room, sitting room, verandah, bedroom and bathroom will be situated on D deck, where also will be six cabins-de-luxe.

Accommodation will be provided for 445 first class passengers in 199 single and 123 two-berth rooms. On F deck the first class dining saloon, measuring 82 feet by 68 feet, will provide seats for 232 passengers. The raised portion of the deck above forms the ceiling of the dining saloon, and gives the latter additional height, an especial advantage in tropical waters.

On B deck are the public rooms, panelled, decorated and furnished in the modern style and promenades for first class passengers. At B deck's fore-end is the reading and writing room, whence one may pass through the ship's spacious entrance (where are the main staircase and lifts) into the lounge and thence to a covered space where the deck is especially designed and laid for dancing. At the after end of the dancing space is a large enclosed verandah cafe.

On A deck there is a sports and games area 275 feet long by 82 feet wide, and this is supplemented by the further provision on C deck of the ship's "Lido". This comprises a swimming pool, verandah cafe and cocktail bar adjoining.

On F, G and H decks accommodation will be provided for 665 tourist passengers in 280 cabins. The tourist dining saloon on F deck, extending throughout the ship's width and measuring 82 feet by 68 feet, will provide 344 seats. On this deck also will be the tourist-class smoking room. On D deck will be found the tourist dancing floor, verandah and barber's shop, and on E deck a swimming pool, a comfortably furnished lounge and the nursery.

Safety, Ventilation, Cargo

For the safety of the vessel in case of fire, the Lux-Rich system of smoke detection and alarm has been fitted, together with a complete installation of sprinklers arranged so that a fire in any part of the vessel so protected shall be subdued automatically. For additional safety the whole of the woodwork in the passenger accommodation and crew's quarters will be covered with fire-resisting paint. Fireproof doors are fitted in all the main alleyways.

To meet varying climatic conditions an air-conditioning plant has been installed to supply the first class dining saloon with fresh air of regulated temperature. The thermotank mechanical system of ventilation is fitted in all public rooms and in the accommodation of both passengers and crew.

Insulated cargo will be carried in Nos. 1, 2, 3, holds and between decks forward. Nos. 4, 5, 6 lower holds aft will be used for the stowage of general cargo. Cargo will be worked by means of derricks served by 3-ton and 5-ton winches and in addition four 10-ton derricks are fitted.

Propelling Machinery

The vessel is to be propelled by twin screws, driven by two sets of Parsons turbines, through single reduction gearing, each set comprising one high pressure, one intermediate pressure and one low pressure turbine, working in series and driving separate pinions engaging with the main gear wheel.

The high pressure turbine is of the impulse-reaction type, the first stage consisting of an impulse wheel with two rows of blades, and the remainder of this turbine comprising six stages of reaction blading mounted on a hollow drum of forged steel.

The intermediate pressure turbine is of the reaction type, having seven stages of blades mounted on a hollow forged steel drum.

The low pressure turbine is of the single-flow type, having sixteen rows of reaction blading mounted on forged steel disc wheels.

The astern turbines comprise one high pressure and one low pressure, working in series. The high pressure astern turbine, comprising one impulse three-row wheel, is incorporated in the intermediate cylinder. The low pressure astern turbine is incorporated in the low pressure casing, and consists of one two-stage impulse wheel, followed by five stages of reaction blading.

The propellers are of the built-up type, each having four blades of manganese bronze, secured to cast steel bosses by mild steel studs and gunmetal cap nuts. A cast iron cone is fitted over the propeller nut. Electrically operated turning gear is provided for the turbines and shafting.

The main condensers are of the Weir's "regenerative" type, suspended from the low pressure turbine casings, spring supports being fitted to relieve the load on the turbines. The total cooling surface in the condensers is 25,000 square feet, capable of maintaining a vacuum of 28 inches of mercury with the barometer at 30 inches, and with a sea water temperature of 86 deg. Fahr.

High Pressure Watertube Boilers

The steam generating installation consists of six Babcock & Wilcox high pressure type boilers, of which

(*Continued on Page* 46)

COST DIFFERENTIALS

In Operating American and Foreign Ships

BY A. H. JANSSON

THE cost of operating any vessel under any flag is made up of certain clearly identified recurring items of expense. For an ordinary ocean going cargo vessel, the total cost of operation may be segregated into nine such items of expense as follows: fuel; insurance of ship and cargo; interest and depreciation; stevedoring; wages; repairs and maintenance; subsistence; pilotage and harbor dues; stores. These cover the actual cost of operation but do not include any overhead expenses such as office staffs ashore, rentals of offices and docks, etc.

It will be noted from Fig. 1, which graphically shows the expense of operation split up into the items referred to above, that four of the items, fuel, insurance, interest and depreciation, and stevedoring, represent 78 per cent of the total cost of operation.

Let us consider wherein an American vessel is at a disadvantage due to higher cost of operation with respect to these items. In the matter of fuel, which represents for the case selected 25 per cent of the total cost of operation, there should be no disadvantage particularly so in the case of oil burning ships. Because of the international character of marine insurance, there cannot be said to be any disadvantage in insurance rates. There would, therefore, appear to be no disadvantage as far as the insurance of cargo is concerned. On the other hand, if the original cost of the ship is higher, insurance on the value of the ship would mean a correspondingly greater premium.

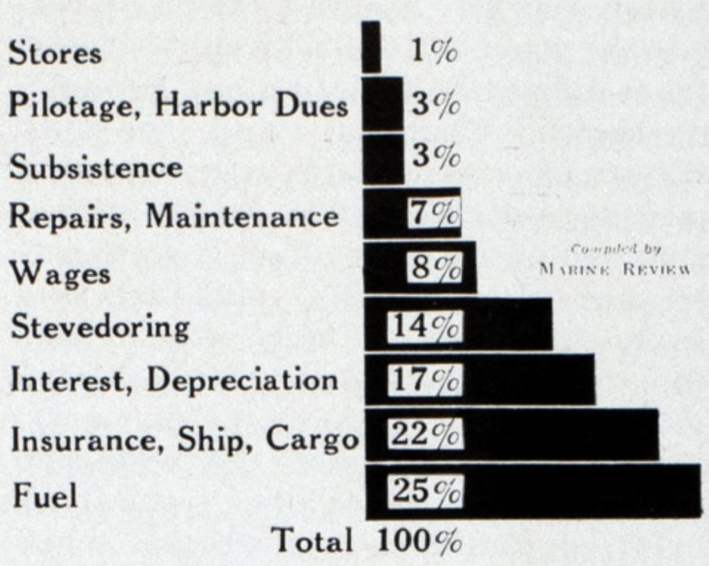


Fig. 1—Items of operating cost of a 7000-ton freighter on fairly long voyages, in percentages of total cost of operation

Stevedoring costs should be approximately the same since the foreign ship discharging or loading in an American port would be subject to the same labor charges and other expenses for handling cargo as would the American ship. The same would apply for an American ship discharging or loading cargo in a foreign port. Of the 78 per cent of the total cost of operation represented by the four items discussed the American operator would therefore be subject to higher expenses on approximately 28 per cent of the total cost of operation allowing that the insurance is divided equally as between ship and cargo.

The remaining five items of expense represent, in the aggregate, 22 per cent of the total cost of operation. Of these, wages represent 8 per cent and here the American operator is faced with definitely higher cost. The same is true of repairs and maintenance; subsistance and stores. It does not apply to pilotage and harbor dues. From this it is clear that in four of the five items under consideration, representing 19 per cent of the total cost of operation, the American operator is at a distinct disadvantage

(*Continued on Page* 44)

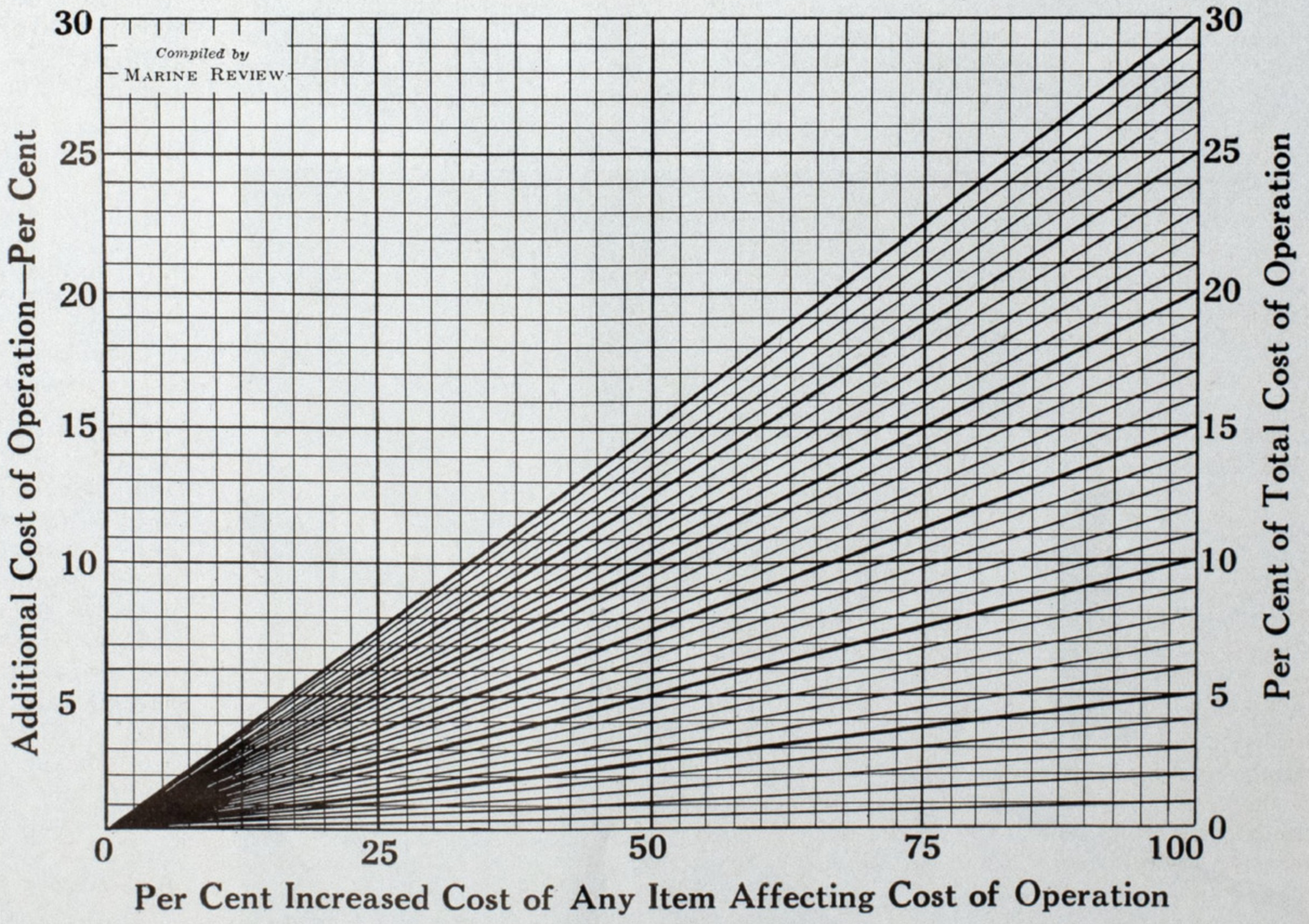


Fig. 2—Diagram for determining additional operating cost, in per cent of total cost of operation of a vessel, due to higher cost of ship, wages, repairs, etc., and for any per cent each of these items may represent of the total cost of operation

MARINE FINISHES,

Painting for Protection and Appearance

BY G. L. HEHL*

EFFECTIVE protection of vessels against rust, corrosion and decay is a' constant and serious problem in ship operation. Not only is protection necessary but a good appearance, especially of passenger ships, is essential in making a favorable name for a line. An intelligent use of the specialized finishes which paint manufacturers have developed expressly for the marine field will now fully meet both of these requirements.

As long as iron and steel remain the principal metals in the construction of ships, the ravages of corrosion will continue to present difficulties. There is also the important matter of protection from fouling which concerns speed and economy of operation. In addition to salt water and air there are other deteriorating elements such as fumes, chemicals, sun heat, abrasion, friction, and expansion and contraction due to extremes of temperature. Paint carefully applied is the only adequate means of protection.

Anti-Corrosive Coatings

Even aluminum and various other alloys normally resistant to corrosion break down when exposed to salt water and air. Simpler forms of corrosion are now considered to result from electrolyctic action on the metal surface. Chemical and physical differences combined with varying stresses on the metals set up potentials which directly affect the concentration of rust. Air, moisture and some impurity, if only the carbon dioxide in the air, are also essential to corrosion. Ions of metal carrying a charge displace the hydrogen atoms of the water. The remaining oxidized film ceases to protect when it unites with water; metallic hydroxide results, which may further react with carbon dioxide in the atmosphere to form, in the case of iron, ferrous or ferric hydroxide and carbonate, known as rust. In the case of salt water the chemical reactions are more complex, but the final yield is metallic hydroxide and carbonate as before.

Extreme care is important in painting ship hulls. All scale and foreign matter must be completely removed. The chemical method of removing scale from new plates is to immerse each plate in a bath of dilute hydrochloric acid (one part of acid per 10 to 20 parts of water). After 30 or more minutes the surface is washed down with alkaline water and scrubbed with high-speed machine driven wire brushes. For the completed ship the most practical way is probably the sand-blast method. A third method is to allow rusting to proceed long enough to loosen the scale and permit removal by hammering and wire brushing. New ships are sometimes sent unpainted on short runs for this purpose.

Primers generally used are red lead, iron oxide, and lead chromate. Tests made at Atlantic City, N. J., supervised by the American Society for Testing Materials, and reported by Henry A. Gardner, chief of scientific section, Paint Manufacturers Association of United States, show American vermillion (basic lead chromate) easily ranks first, and other paints made on chromate bases made excellent showings. Sublimed blue lead ranks slightly lower. Red lead while rated lower is improved when litharge is added up to about 10 per cent. The lead-chromate base primer given a vehicle of carefully blended resins, tung oil, treated linseed oil and driers, may be sprayed or brushed more easily than red lead. It is resistant to sulphur fumes, withstands abrasion, weathers exceptionally well without a finishing coat, and is considerably less expensive than red lead. Very thorough drying (two months) is essential in priming new ships before final coating and launching.

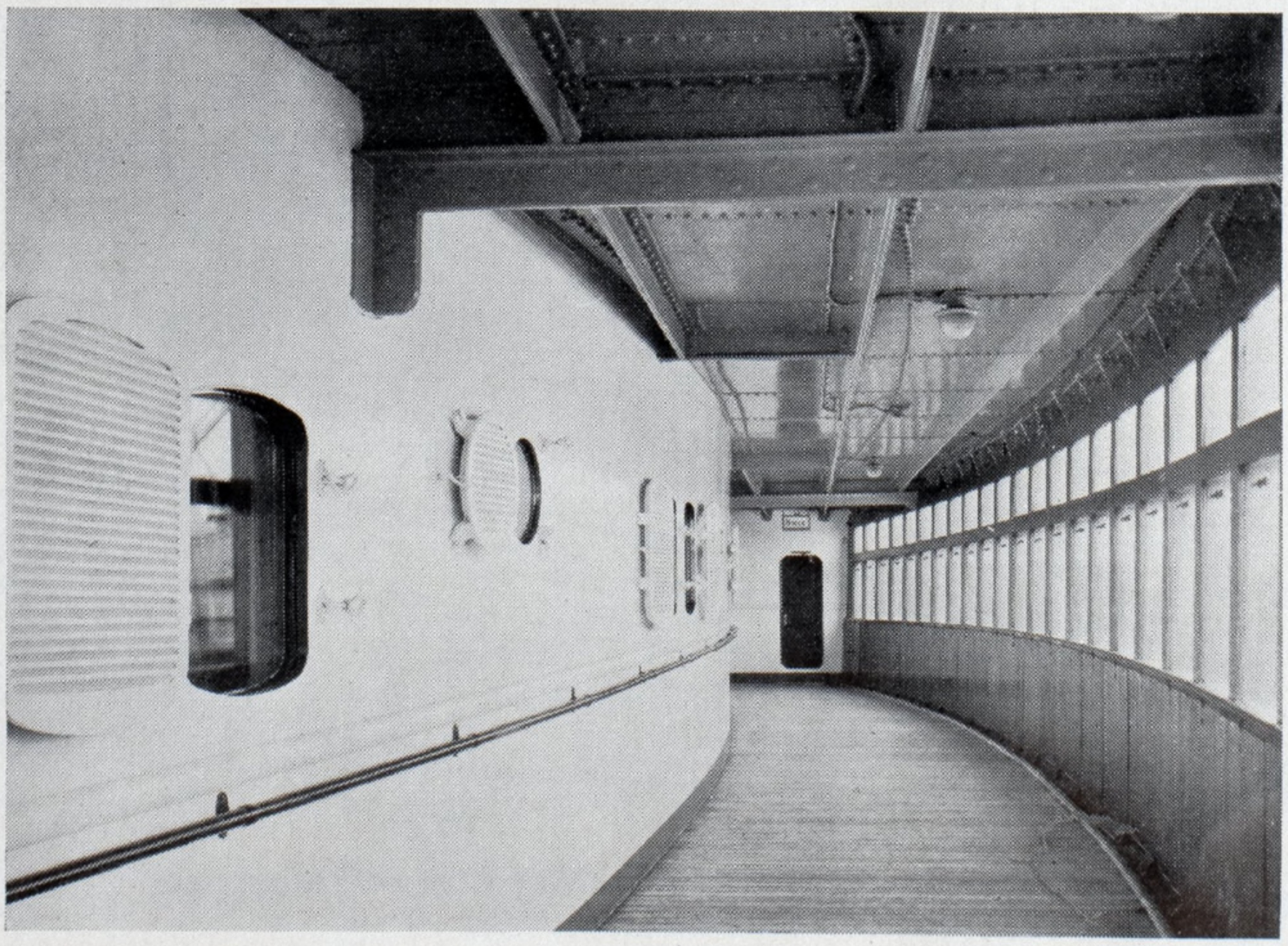
Where speed is essential the use of a quick drying iron oxide primer incorporated in a special vehicle is recommended as an excellent anti-corrosive undercoater for anti-fouling composition paints. Two coats of anti-fouling are generally recommended.

Anti-Fouling Paints

Copper paints are used on wood bottoms of ships, launches, lighters, coal barges and other water craft and submerged piers, etc., because anti-corrosive coats are not needed. Good grades contain a maximum amount of oxide of copper, which insures effective protection against water and all forms of marine growth and animal life. The addition of silica makes the film tougher and better bonding; and pine oil, driers and a good percentage of highly resistant varnish, etc., are essential to a smooth, durable and repellent copper paint coating.

Both steel and wooden ship bot-

*The author is general superintendent of the Newark, N. J., plant, The Sherwin-Williams Co. The illustrations are views of the S. S. LEVIATHAN, courtesy of Sherwin-Williams.



toms are subject to fouling from marine life. In the case of wooden ships, marine borers have always presented a problem. Steel ships have the disadvantage of corroding. Paint and anti-fouling compositions are the best known means of overcoming the ravages of decay, rust and incrustations of marine life.

Some idea of what fouling of a ship means in dollars and cents can be gained from Sabin, who in his "Technology of Paint and Varnish" quotes the late Admiral Bowles, a former chief constructor of the navy, as authority for the statement that, "while the fouling of the battleship INDIANA between her launching and trial was very slight, it was sufficient to make a difference to the builders of $100,000 in the premium earned for speed. It probably increased the resistance of the ship about 15 per cent. A ship subject to ordinary service, staying in port about half the time, will foul so rapidly that in from six to nine months there will be a loss of speed of from 25 to 40 per cent; where ships are running regularly the loss is less." (Trans. AM. Soc. C.E., Vol. 36, p. 494). This loss means days of delay, added fuel costs, and all other costs proportionally higher for the service rendered.

Suitable anti-fouling compositions for steel or iron vessels are of basic ferric-oxide, incorporated in a vehicle that makes these paints dry to a smooth finish avoiding friction and helping to prevent the adherence of animal and plant life. They should be easily applied and dry with sufficient speed to allow the return of the ship to the water shortly after application. Poisonous constituents employed in these finishes are usually mercury and copper oxides. Properly formulated, these paints should soften slightly with water to permit poisons to dissolve so as to be available to the organisms which infest the vessel. Elasticity to withstand expansion and contraction from temperature extremes is essential and a slimy film discourages adhesion of these growths. Paints of this character should be applied up to the light load line. The frequency of the applications depends upon the waters travelled.

Between the full and light load lines the use of special boot-topping paint is recommended to withstand the extreme alternate conditions of exposure to salt water and air, heat and cold. These are obtainable in colors, as are other finishing coats.

Hull and Deck Finishes

A new aspect to consider in the selection of hull paints is the heat deflection value of paints. Just as white paint is the most efficient reflector of light, it is the best deflector of heat, being considerably more efficient than metallic aluminum and darker shades of oil paints. White paint not only looks cooler, it is cooler. Some time ago the Cunard line announced their plans to paint the FRANCONIA white for her next world cruise. This decision was made after engineers reported that from observations taken during cruises of the MAURETANIA to the West Indies it was found the liner was from 7 degrees to 9 degrees cooler in her white dress.

Not only does white paint deflect heat rays of the sun, it increases radiation of heat from within, increasing passenger comfort and facilitating keeping perishable goods. Tankers carrying volatile liquids will find evaporation reduced and refrigerator ships will find savings in the cost of refrigeration.

The most satisfactory hull finishing paints are of the multi-pigment oil and varnish type. High grade pigments are important in securing colors that withstand the constant salt spray and give good appearance.

It is also important that these pigments be suspended in a vehicle sufficiently elastic to withstand sun heat and yet be hard enough to stand up under abrasion against the docks. Properly formulated. hull paints will work easily under the brush, cover solidly, dry quickly, permit re-touching all abrasions and give a full gloss finish capable of withstanding for the longest possible time, the severe exposure which this type of paint must actually meet.

Scuppers or runways, steel decks and cargo holds are effectively treated by painting with iron-oxide base paints. The exact composition varies according to the special conditions each surface is subject to. Paints specified for steel decks must withstand hard wear.

In the case of wood or canvas decks, multi-pigment oil and varnish paints are recommended. Paints formulated for this specific application will bond better, afford maximum protection and possess the necessary elasticity for this type of surface at the same time they will withstand wear and abuse.

Frequently the desire is to retain the natural, bright color of the new wood. Where linseed oil or other familiar preparations are used the result is usually meager protection for a short period of time and a marked tendency for the deck wood to darken badly. Special wood deck sealers are obtainable and highly recommended for natural finish decks.

This deck seal oil is ideal for sealing, preserving and surfacing wooden decks. When used on new decks the natural, bright color of the wood is definitely preserved. It is also especially effective in sealing wood fibre raised by frequent sandings, and prevents raising of the wood fibres as well as water proofs the surface. In the case of new canvas covering, the recommended practice is to apply a coating of liquid white lead. This will soak up into the canvas, after which, it should be painted on top with canvas deck-seal gloss paint.

Inasmuch as the fine appearance of any ship depends so much upon the finish of the super-structure, only highest quality deck house and bridge paints should be used, whether they be white or in color. Finishes of this character must be resistant to the most severe exposure, they must be washable, apply easily, cover well, withstand chemicals and not discolor. While multi-pigment full-bodied oil paints and long oil

(*Continued on Page* 46)

RIVER TOWBOAT

Coiner Enters Service, Trials Successful

BY H. H. HAAS

EMBODYING the latest marine engineering advances, and typifying in every detail the most modern refinements in ship design as applied to river tow-boats, the COINER, recently completed for the United States engineers by the Marieta Mfg. Co., Point Pleasant, W. Va., was given her official trial run in the Ohio river, off the plant of the builder, on March 25.

The COINER, designed in the marine design division, office chief of engineers, Washington, D. C., under the able supervision of Capt. Elliott Vandevanter, U. S. A., will be used in general towing service in the Vicksburg, Miss. district. The vessel is the largest, most powerful towboat placed in service by the United States engineers, and one of the largest towboats ever launched for use on our inland waterways.

With her trim, clean-cut appearance, and absence of smoke, this twin screw diesel powered vessel, symbolizing the new era in designing, building and powering of modern river craft, made a striking appearance on her trial run, and met every test perfectly. The main color scheme of the vessel is white with black trim. Hull and main deck are jet black. Sides of main deck house for about three feet up from main deck are dark grey; remainder of main deck house, as well as the cabin and pilot house, including windows, doors, rails, scuppers, and other fittings, are snow white with jet black trim. Exhaust stacks are jet black, with the engineer corps' aluminum insignia—the castle—secured to the outboard side of each stack. This color scheme, supplemented by the United States engineers' red pennant at the front masthead, makes the COINER a most distinctive vessel.

Launching of the Towboat Coiner on Feb. 7 at Marietta Mfg. Co.

In the last two years the Marietta Mfg. Co. has completed a number of large river dredges for the army engineers, several coast guard cutters, and a number of other units for river service. Incorporated in the design of the COINER are a number of novel features. Construction details follow. Her length, molded is 176 feet; length overall 177 feet 3¼ inches; breadth hull, molded, 38 feet; breadth overall, 38 feet 9¼ inches; depth, molded, 8 feet 6 inches; draft, 5 feet 2 inches.

Construction of Hull

The hull is built to the rules of the American Bureau of Shipping. The entire hull is of genuine wrought iron plate. Longitudinal bulkheads are provided the full length of hull 11 feet 6 inches from center line on port and starboard sides, and are oil tight in way of oil bunkers, and water tight from the aft to forward compartment. A number of water tight transverse bulkheads are provided for the safety of the vessel.

An unusual feature is the arrangement of main deck in engine room. The center bulkhead is carried the full depth of the hull throughout the engine room. The main deck also is continuous throughout the whole length of engine room, and openings are cut only to allow the main engines to protrude with sufficient margins to allow for any dismantling of the engines, and for removal of auxiliary machinery installed below deck. Removable gratings are fitted close to the engines. Access to lower engine room is aft of engines, with emergency exits at forward end of each engine.

The main deck house is built of steel. The upper deck house and pilot house are of wood.

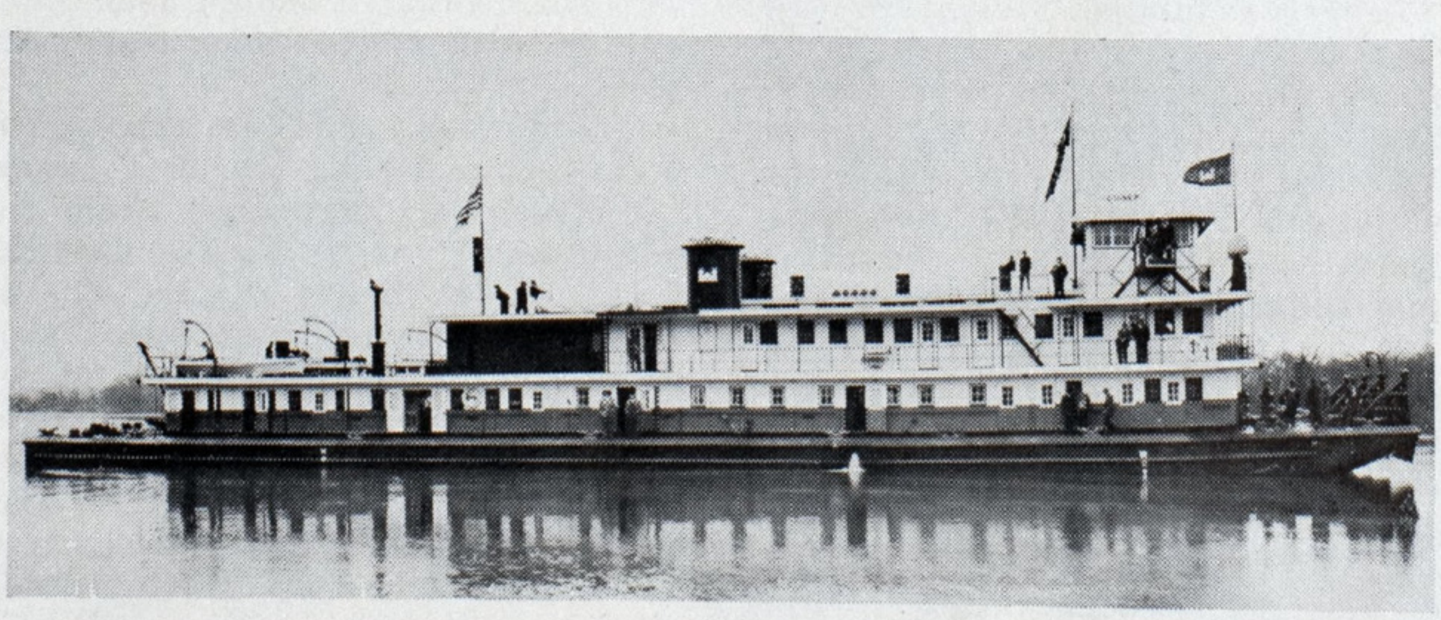
The deck is covered throughout with Johns Manville asbestos roofing.

Individual Venturi type tunnels are provided for the propellers, with removable cover plates to facilitate propeller repairs without docking of the vessel.

All the compartments are fitted with individual ventilators, which are concealed in the main deck house bulkheads. These ventilators are entirely of new design and prevent sweating.

The galley is of modern design, and is equipped with two 4-foot single oven, diesel oil burning ranges, with panel tops. The mechanical burners were manufactured by the Ray Burner Corp. A spacious one-piece, two-compartment, monel metal sink, and double drain board, is provided. Large steel racks and shelves are fitted in convenient localities for storing all the heavy duty aluminum kitchen utensils.

Adjoining the galley forward are separate officers' and crew's mess rooms, fitted with built-in dish closets, and excellent furniture. The



Twin screw, tunnel stern diesel Towboat Coiner on trials March 25

large cold storage box, which is divided into meat and vegetable compartments, is located aft of the galley and opens into it. The cold storage box is cooled by direct amonia expansion.

A complete modern laundry, with all electric operated washing machine, extractor, and ironing board with electric iron, is provided.

Quarters are provided for sixteen in the deck and galley crew on the main deck aft, with toilets and showers adjoining. These quarters have excellent ventilation and light. Individual metal lockers for each man are placed conveniently. The general layout of these quarters will make for better sanitary conditions for this part of the crew, which has been often times neglected in the old river towboats.

The stairways leading to the upper deck are located port and starboard forward of the engine room.

Arrangement of Quarters

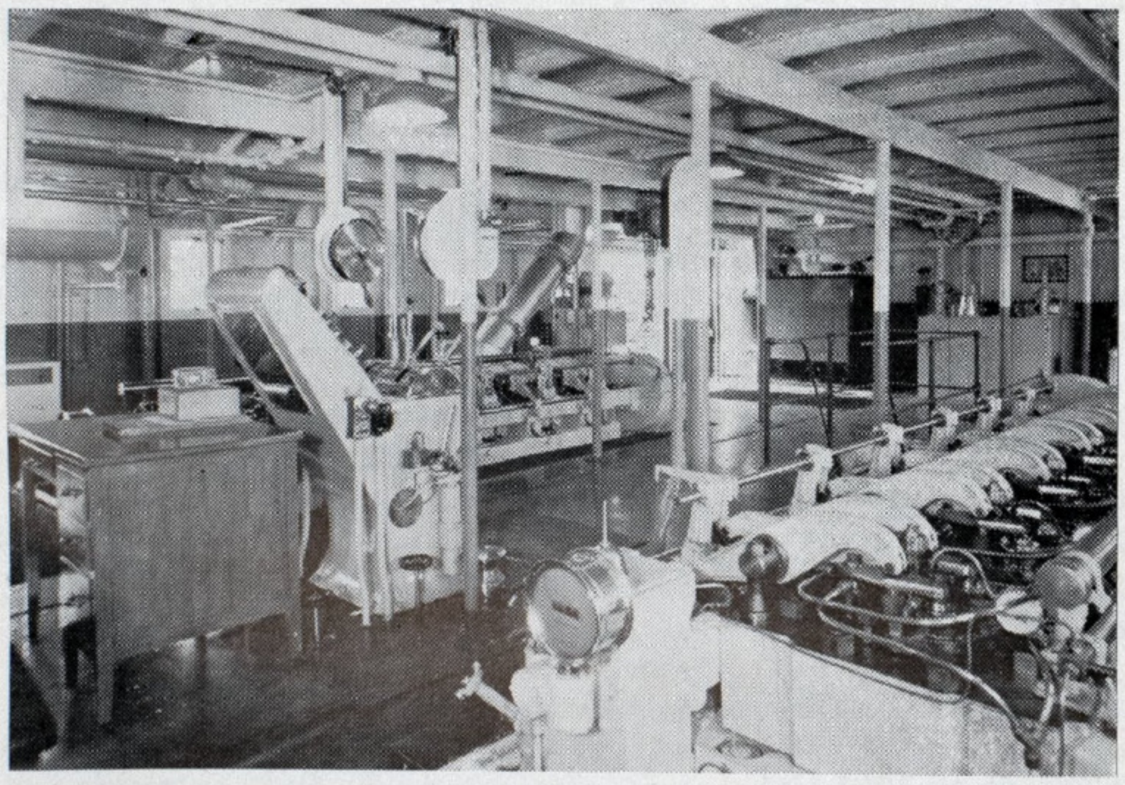
A unique feature is the location and arrangement of the engine room crew, which is on the main deck just forward of the engine room. Oilers' and wipers' quarters, with showers and toilets between, are separated from the engineers' by a transverse passage-way. The chief engineer's quarters are fitted with individual shower and toilet. The remaining engineers' quarters are arranged with shower and toilet between. This arrangement is conducive to better efficiency, the crew being near the engine room and all grouped together.

The stairs from the main deck, port and starboard, land in a through transverse passage in the main cabin. A fore and aft main passage, gives access to each stateroom. This passage also leads direct to the spacious modernistically furnished lounge forward. A stairway leading direct to the pilot house is located in the lounge, for the convenience of officers in inclement weather. To the rear of this lounge on the starboard side is the captain's quarters, and port the visiting officer's quarters, each of which is provided with private shower and toilet. Aft of these accommodations are the radio operator's quarters and radio room, on the starboard and two staterooms for four pilots on the port side.

Aft of these quarters on the port there is a stateroom for the mates, and starboard a toilet and shower room with three lavatories. The watchmen's stateroom is located aft of the mates' quarters. The laundrer's quarters and laundry, with spacious linen lockers and private bath, are separate, and complete the quarters on this deck.

A large screened deck space 24 feet by 22 feet forms an extension to the rear of the cabin for use by the officers. A five-foot covered guard extending both port and starboard allows additional access to each stateroom, laundry, lounge and stairway passage. From this guard stairs lead to the hurricane deck.

The pilot house is located on the hurricane deck immediately over the lounge, and is equipped with modern rudder controls, luminous helm indicators, ship telegraphs, engine speed indicators, signal and searchlight controls, speaking tubes to engine room and captain's quarters.



Engine room of Towboat Coiner looking aft. Two main propelling Winton diesel engines. Control stand between the engines at forward end

Pilot house of Towboat Coiner. Engine room signals. Steering engine controls

A flying bridge of steel construction is fitted port and starboard to the pilot house.

The 19 inch motorized searchlights are located on the forward corner of the hurricane deck port and starboard, and are controlled electrically for any position from the pilot house.

Main Propelling Machinery

The two main propelling diesel engines are each rated at 650 brake horsepower at 250 revolutions per minute, direct reversible and were built by the Winton Engine Corp. Cleveland. On the test block these engines developed 826 brake horsepower at 250 revolutions per minute, and could have done even better than that had the water brakes been able to absorb more horsepower. On similar engines the United States engineers purchased for the sea going hopper dredge TAYLOR the engines developed on the official test 968 brake horsepower at 275 revolutions per minute. Extreme care was taken to calculate beforehand the torsional vibrations. This is a customary precaution with the United States engineers on all of their installations. The result, therefore, is that the engines can be operated in their entire speed range with a total absence of vibration usually encountered at some point where this most important requirement is neglected.

Each engine swings a 7-foot propeller of special design to give the boat the best possible towing quality. The thrust bearings were manufactured by the Kingsbury Machine Works. Instead of placing the thrust block next to the engine, the thrust is some 17 feet away from the engine, so that only torque and no thrust is transmitted through the line shaft. The stern tubes and struts are provided with Goodrich rubber bearings.

There are two diesel generating sets, each having a capacity of 75 kilowatts, operating at 750 revolutions per minute. To avoid vibration 6-cylinder units were selected. For

weekend service there is a 15 kilowatt diesel generating set operating at 600 revolutions per minute. All three generating sets were manufactured by the Winton Engine Corp. Each of above engines has attached lubricating oil pumps. The generating set engines drive generators built by the General Electric Co.

A specially designed control stand, believed to be the first of its kind, is mounted on the main deck between the main engines. One operator can easily operate both engines. One lever for each engine for reversing can be manipulated by the operator at the same time. The other two levers are for speed control. In back of the operating stand are all necessary gages mounted in plain view of the operator. On each side of the operating stand are the engine room telegraphs. The Brown pyrometer is mounted close by on the left of operating stand, within reach of the operator. This pyrometer serves both main engines. The Winton Engine Corp. co-operated to the utmost in developing this operating stand to the requirements of the department.

The generating sets are on the main deck forward of the main propelling engines, and the switchboard is mounted on the forward bulkhead.

Engines Water Cooled

All diesel engines on this vessel are provided with Vortex spark arrestors, manufactured by the Engineering Specialties Co. Three of these units are installed in neat looking stacks on the port side, and the other two, as well as the house boiler stack, are mounted in the starboard stack.

The engines are water cooled with fresh water. A 2500-gallon cooling water tank is provided. Also two fresh water coolers, each serving one main engine and one 75 kilowatts generating set. The coolers are of liberal capacity to take care of reduction in transfer efficiency due to scale forming and also that both main engines may be operated on one cooler at about three-fourths speed; should it become necessary to clean one cooler by the crew, the vessel would not be out of commission. The oil coolers use fresh water only to cool the lubricating oil. Sea water is circulated through the fresh water coolers overboard. A weighted check valve is attached to side of hull to maintain a discharge pressure of 12 pounds. A branch line is installed ahead of this check valve to each stern tube. No valves are provided in this line except a cock at the stern tube which normally remains open. This assures a positive means of supplying water to the rubber bearings automatically whenever the engineers start the main engines.

There are two automatically operated centrifuges aboard, manufactured by the Sharples Specialty Co., both of the same capacity, rated at 300 gallon per hour. One is to serve the lubricating oil system; the other is for the fuel oil system. There are two lubricating oil sump tanks. One will be in service, while the other one can be used when desired to purify the oil in the system. The centrifuge will be supplied with oil from the sump in service, while the purified oil will be discharged to the empty sump until half of the oil has been purified. The operator will then change his control valves so that the engines take oil from the purified oil sump and also discharge to this sump. The centrifuge, however, will still be supplied from the former sump until all the oil has been purified.

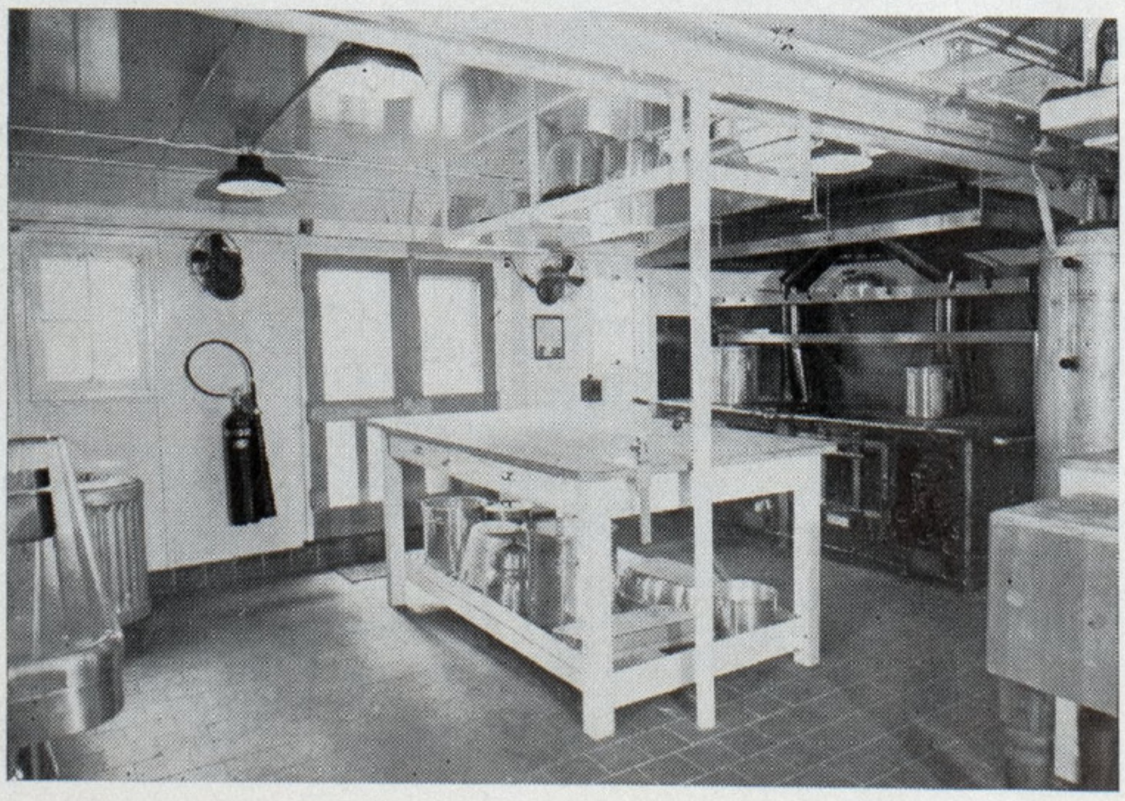
There is a 1200 gallon centrifuged fuel oil tank from which the 100 gallon service tank receives its purified fuel by means of attached service pumps on each engine. The service tank is full at all times, and overflows any surplus fuel back to the 1200 gallon tank. The attached pump on the centrifuge takes its suction direct from one or both fuel oil bunkers built in the sides of the hull on port and starboard sides of after engine room. There is sufficient fuel bunker capacity to operate the vessel for three weeks without refueling.

A 175 gallons per minute fire pump is installed below the main deck. This pump serves also as a stand-by unit for the circulating water coolers for river water, and for stand-by service to the filter feed. The self-priming bilge pump has a capacity of 200 gallons per minute.

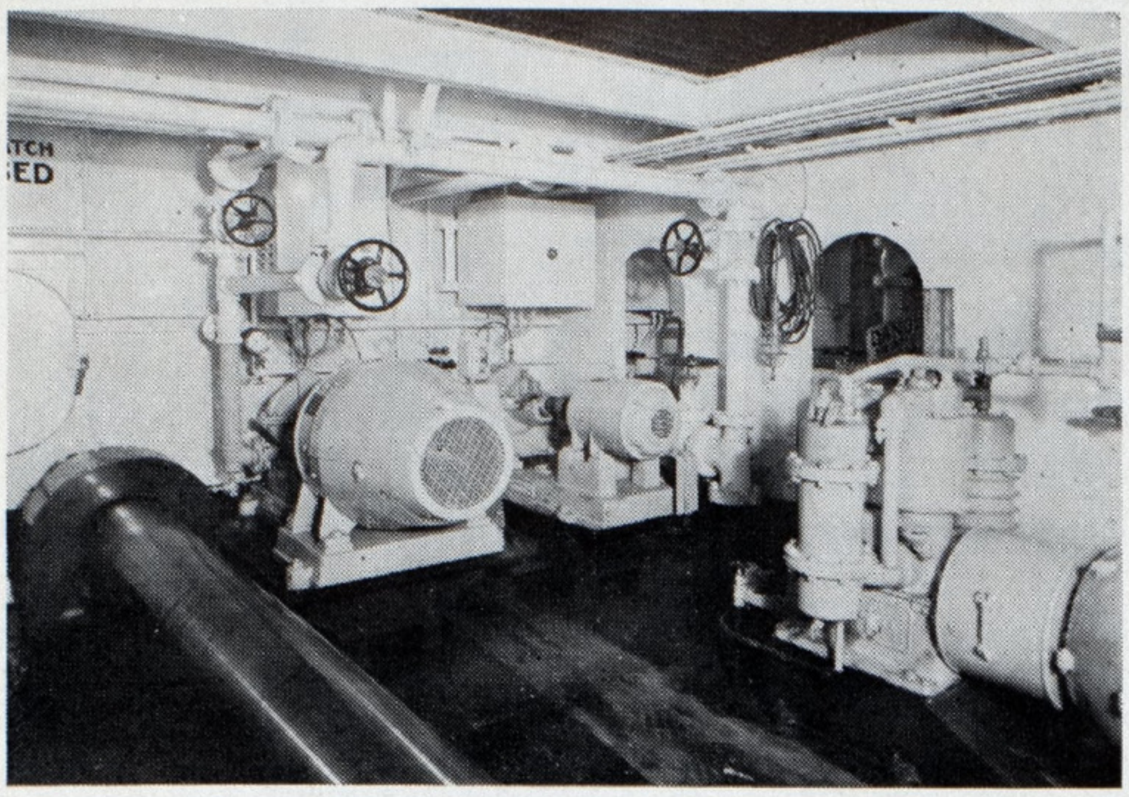
Independent Air Compressors

There is no attached air compressor on the engines, but instead there are two 60 cubic foot compressors, manufactured by the Ingersoll-Rand Co. These compressors are automatically operated from push buttons mounted direct on each side of operating stand on main deck. Sixteen starting air tanks provide ample air storage to start each main engine 55 times without replenishing the air. These air mains each connected to eight air tanks lead to a common starting air line for the two propelling engines. Control valve extensions reach through the main deck to each side of the control stand. Normally, only one bank of air tanks are necessary to maneuver the vessel. Should, however, additional air be needed the operator would close the active line where the pressure had fallen, and open the fully charged bank. He can also operate the air compressors

Officers lounge on Towboat Coiner, with furnishings of modernistic pattern



Galley on Towboat Coiner. Fully equipped with modern apparatus including two oil burning ranges



Engine pit of Towboat Coiner looking aft. One of the main propelling shafts. Auxiliaries

without leaving his operating stand.

The low pressure air system receives its air through a reducing valve from the active air bank. Low pressure air is used to blow out the sea chests, for the air tools in engine room, and for the air motors, for turning the main engines when not in operation, also for the "Typhon" sound signal.

Besides the 15 kilowatt diesel generating set, there is installed a 53 cell iron clad Exide battery to furnish light when no engines are operated and the vessel is tied to the dock.

Four Lynn stone filters are installed complete with chlorinator, so that the vessel can make its own fresh water from river water in case of necessity. For drinking and cooking, there are two 1600 gallon tanks that can be filled from shore. Fresh water is used exclusively for all wash basins, showers and toilets. Hot water for the ship is provided by the hot water boiler in the galley. There is, however, additional supply for hot water from a simple coil installed in the starboard main engine exhaust header. A 250 gallon hot water boiler is installed in the engine room in series with the 100 gallon hot water boiler in the galley. This will give all the hot water necessary, and is simple and inexpensive.

Heating and Refrigeration

A Crane house boiler installed in the engine room provides for heating the vessel. All radiators used are the latest copper fin type. These radiators require very little space, and only a fraction of weight compared with the old type cast iron radiators.

A Baker refrigerating and ice making plant is provided to manufacture 125 pounds of ice in 24 hours, and cool the vegetable and meat rooms. The plant is entirely automatic, controlled by thermostats.

The steering gear machines are manufactured by the American Engineering Co. They are of the hydraulic type, and each machine is operated by a three horsepower motor. There are two sets of forward rudders and two after sets. The rudders are of the balanced type carried in ball bearing races.

The vessel is equipped with a complete radio outfit for sending and receiving.

There are four fire plugs on main deck and three on upper deck. In addition, there is a fixed carbon-dioxide system for protection against fire in the paint, oil and lamp room, and engine room pit, by the total flooding method. Two hose-reel carbon-dioxide fire extinguishers, each with 50 feet of hose, are independently installed in accessible positions in the engine room.

Deck Machinery

There are two double barrel capstans, built by Marietta Mfg. Co., mounted on the forward end of vessel, and one on after end, each operated through spur and worm gear by a 20 horsepower motor.

Electric hauling winches of American Engineering Co. make are installed on port and starboard side in forward end of engine room. These winches are operated by 10 horsepower motors.

There are no special pumps installed in the vessel to pump barges. Instead, there are 4 portable electric-driven barge pumps, manufactured by W. F. Stuckeman & Co., Pittsburgh. These pumps can be carried by one man by dismantling the motor, or easily by two men when fully assembled.

Trial Trip Results

The official trials, conducted on March 25, 1935, proved that calculations for machinery and equipment were correct. The propeller design on the Coiner exceeded the highest expectations of her designers. The vessel made a speed of 13.3 miles per hour in still water at its rated engine speed of 250 revolutions per minute, each engine developing 650 brake horsepower. The apparent propeller slip was 6.3 per cent. In the backing test, the boat, going downstream at a speed of 17 miles per hour, came to a dead stop in approximately 50 feet, with the engines turning 300 revolutions per minute.

The performance of the propellers on the Coiner is a new milestone for river craft, and a blow to the old paddle wheel design.

One man in the engine room did all of the maneuvering on both engines from the control stand. The control seemed almost human in its operation, and the telegraph orders were answered without delay of any kind.

Contract has been awarded by the United States engineer office, Kansas City, Mo., to the Dubuque Boat & Boiler Works for the construction of one 250-horsepower survey boat, using Fairbanks, Morse & Co. diesel engine, on its bid of $61,800, received March 6.

Heavy cruiser No. 39, the U. S. S. QUINCY, now building at the Fore River plant of the Bethlehem Shipbuilding Corp., Quincy, Mass., is scheduled for launching on June 19. The sponsor is to be Mrs. Henry S. Morgan, daughter of former Secretary of the Navy Charles Francis Adams.

Complete modern laundry with electrically operated washing and ironing machines. Towboat Coiner

Late Decisions in Maritime Law

Legal Tips for Shipowners and Officers

Specially Compiled for Marine Review
By Harry Bowne Skillman
Attorney at Law

A SHIPOWNER could not escape liability for fines imposed for failure to detain alien seamen because the order for detention was served on the fourth officer where the officer was in charge of the vessel at the time of service of the order, and the master had notice of the order before the aliens escaped. —Compagnie Generale Transatlantique v. Elting, 74 F (2d) 209.

* * *

GENERAL duty of a vessel not to anchor in a fairway exists in a fog as well as at any other time, but like most duties it is not absolute; she may have an interest which will excuse her; for example, the fog may be so dense, the quarters so close, and a safe berth so difficult and dangerous to reach, that the balance of advantage to all concerned makes it best to anchor where she is. Having so decided, in the case of SOCONY No. 9, 74 F. (2d) 233, the court further said that it cannot be the duty of a tug at all times to ring for its tow. For instance, if the vessels are strung out on a hawser, it can add nothing to the protection of one of them, perhaps a thousand feet away, which is ringing its own bell, to have the tug ring too. The duty can only be when all are in a huddle. Perhaps the added din may then have an advantage, but the rule does not even remotely intimate that a tug owes such a duty.

* * *

INJURIES occurring upon a dock are injuries upon the land, and admiralty has no jurisdiction of cases due to defective gangplanks. This is true whether the injured persons were getting on or off the ship.—ADMIRAL PEOPLES, 73 Fed. (2d) 170.

* * *

BOTH tugs were held at fault by the court in the case of TRANSFER No. 18, 74 F. (2d) 256, it being shown that one tug continued up stream in ebb tide with a heavily laden tow without attempting port passage or reversing, and the other tug emerged from a slip and swung its tow into the channel in the course of the other tug without sounding a passing signal. Where a vessel is entering or leaving a slip and has not yet begun to navigate on a steady course, and a tow is going up or down the river, the ordinary steering and sailing rules and signals made for vessels navigating on definite courses do not apply, but each vessel must proceed with due regard to all dangers of navigation and collision.

* * *

EVIDENCE that sulphur was shifted by the use of clam scoops which previously had been used in lifting iron ore, and that pieces of ore could have become lodged on the girders and flanges of the scoops, was held sufficient in the case of Connecticut Fire Insurance Co. v. Lake Transfer Corp., 74 F. (2d) 258, to establish negligence in the contamination of the sulphur with ore, no proof having been offered that the scoops had been cleaned before using them to lift the sulphur, and the inflammability of sulphur and danger of having iron produce sparks and start a fire being well known.

* * *

A SECOND class passenger suffering from seasickness was entitled to rely upon the statement of a uniformed officer of the ship directing her to a deck reserved for first class passengers, it was held in the case of Silverman v. Bermuda & West Indies Steamship Co., 74 F. (2d) 683; and the duty a steamship company owes to passengers arising out of the contract of carriage, the court declared, does not cease as to a second class passenger who goes on a first class deck masquerading as a first class passenger. In this case it was held that the company's liability to the passenger for injuries resulting during heavy weather when deck chairs which a member of the crew had lashed into position slid toward the deck rail was a question for the jury under the evidence.

* * *

A SEAMAN, who in rough weather knowingly attempted to go to the messroom over the exposed well deck instead of through the shaft tunnel and was swept overboard, assumed the risk of such course. Two ways being available, one dangerous and the other safe, the seaman assumed whatever risk was involved in taking the dangerous course when he selected it through his personal choice and not because of any compulsion or ignorance of the situation. The master, who in a raging sea decided it was better to bring the ship to windward of the seaman overboard and lift him aboard rather than to launch a lifeboat, was not negligent so as to render the shipowner responsible for the seaman's death.—Johnson v. United States, 74 F. (2d) 703.

* * *

MASTER of a ship is the commander of the ship, controlling, not only her movement and cargo, but her earnings, which he may apply in the ship's indebtedness to him for wages; he is the lord of his little world. A seaman, in the broad sense, is a mariner of any degree, one who lives his life upon the sea and doing things affecting the operation and welfare of the ship when she is upon a voyage. In the case of Wandtke v. Anderson, 74 F. (2d) 381, it was held that one who neither controlled ship's movements nor its employment; signed no bills of lading; collected no freight money; but served as an engineer, as an operator, and as a stevedore, was nothing but a foreman, and as such came within the category of a seaman, and was entitled to priority of claim for wages.

* * *

WHERE a carrier engaged an illiterate alien seaman for a round trip voyage out of New York, but the voyage was broken up in England, whereupon the carrier gave the alien free passage back to New York, the carrier was liable to fine for bringing an illiterate alien to the United States. Where proof showed that previously an alien had been admitted as a domiciled alien, and had applied for naturalization, though he had not brought his family back with him on the trip when he was excluded, the carrier was entitled to recover the fine imposed. International Mercantile Marine Co. v. Elting, 74 F. (2d) 661.

Marine Business Statistics Condensed

Record of Traffic at Principal American Ports for Past Year

New York

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
April, 1935	460	2,823,172	460	2,297,895
March	424	2,151,900	454	2,240,198
February	368	1,846,603	384	1,813,244
January	412	2,069,982	440	2,131,740
December, 1934	424	1,928,702	401	1,896,182
November	412	1,834,078	427	1,944,737
October	429	2,080,505	413	2,027,222
September	403	2,125,445	400	2,067,354
August	439	2,354,288	470	2,458,165
July	449	2,180,813	428	2,155,129

Philadelphia

(Including Chester, Wilmington and the whole Philadelphia port district)

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
April, 1935	138	376,748	168	561,034
March	144	453,643	140	449,186
February	102	312,963	119	384,859
January	105	336,019	116	376,343
December, 1934	125	396,724	127	416,978
November	118	355,338	121	355,754
October	128	391,788	142	440,734
September	110	342,094	122	382,412
August	135	406,481	116	371,257
July	103	312,241	90	304,511

Boston

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
April, 1935	122	429,195	124	457,417
March	124	447,541	126	446,456
February	104	385,520	107	394,441
January	116	445,990	114	427,402
December, 1934	121	452,109	129	479,607
November	124	447,502	115	437,062
October	127	498,892	125	500,447
September	141	514,706	145	528,039
August	164	605,680	164	603,528
July	174	657,228	175	662,899
June	168	574,635	173	597,136
May	132	470,580	136	487,529

Portland, Me.

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
April, 1935	11	27,747	11	23,129
March	10	24,475	9	21,745
February	11	23,834	12	27,693
January	12	31,676	10	25,804
December, 1934	12	24,738	16	37,026
November	21	41,916	19	34,399
October	19	34,735	17	28,611
September	16	35,064	15	34,285
August	23	31,559	21	31,672
July	14	27,034	12	26,525

Providence

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
April, 1935	6	20,333	3	6,596
March	6	20,792	4	14,033
February	5	22,152	6	25,619
January	4	12,463	7	20,586
December, 1934	1	2,316	4	13,221
November	4	9,158	4	9,005
October	4	12,988	1	1,901
September	4	13,022	3	8,842
August	9	12,502	6	14,125
July	5	16,045	7	26,773

Portland, Oreg.

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
April, 1935	29	105,011	32	115,386
March	37	143,915	37	144,379
February	41	160,445	45	175,091
January	45	157,562	45	158,661
December, 1934	40	149,728	50	187,452
November	45	175,245	45	169,005
October	48	183,575	47	182,669
September	29	111,782	41	147,290
August	40	157,873	50	198,204
July	12	46,946	13	46,627
June	10	34,726	2	6,136

Baltimore

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
April, 1935	104	316,476	104	331,839
March	100	293,568	107	325,453
February	85	267,417	92	291,094
January	86	276,468	88	286,810
December, 1934	97	299,281	95	309,991
November	88	271,778	94	288,109
October	96	282,930	100	308,916
September	91	276,111	93	284,297
August	92	278,812	96	280,641
July	108	319,702	106	317,583
June	108	339,280	112	356,445

Norfolk and Newport News

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
April, 1935	127	388,429	122	380,770
March	122	374,447	127	391,523
February	109	330,108	115	335,404
January	138	429,759	136	402,944
December, 1934	148	420,417	138	401,430
November	120	389,510	124	366,913
October	112	333,739	112	330,639
September	116	335,573	111	329,199
August	101	372,267	109	345,115
July	99	303,312	101	302,165
June	127	352,274	125	341,292

Jacksonville

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
April, 1935	16	21,484	20	38,114
March	13	12,954	17	31,231
February	9	14,722	12	23,360
January	5	12,273	10	30,335
December, 1934	7	7,116	15	33,473
November	20	29,468	13	25,052
October	13	22,913	17	32,357
September	18	21,329	18	24,657
August	20	25,558	21	37,676
July	18	16,470	16	18,145

Key West

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
April, 1935	52	39,491	38	46,737
March	31	37,869	30	34,093
February	32	34,322	32	37,498
January	32	37,232	34	37,563
December, 1934	31	47,048	33	48,609
November	33	41,770	35	42,891
October	37	38,904	34	36,799
September	29	32,068	30	33,182
August	32	34,292	34	34,616
July	35	34,692	33	34,364

Mobile

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
April, 1935	40	112,784	39	106,734
March	45	109,978	46	112,995
February	41	102,099	36	91,813
January	46	129,386	48	135,215
December, 1934	43	111,212	42	106,660
November	38	96,522	39	106,495
October	45	135,301	42	123,063
September	36	86,368	41	103,621
August	47	136,429	41	119,940
July	37	107,683	31	88,775

Seattle

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
April, 1935	47	200,067	50	206,729
March	42	182,384	47	202,641
February	48	211,876	47	203,927
January	56	212,386	63	249,805
December, 1934	51	222,427	47	201,642
November	46	185,293	48	205,795
October	54	230,438	55	222,014
September	45	184,361	43	221,241
August	43	176,644	54	223,038
July	24	93,558	20	82,646

New Orleans

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
April, 1935	188	504,227	173	465,173
March	183	474,712	173	425,843
February	166	457,420	165	439,990
January	166	457,267	166	435,232
December, 1934	172	472,463	174	477,672
November	157	431,288	157	430,060
October	175	499,832	177	492,802
September	159	453,453	157	426,341
August	145	385,557	154	403,163
July	156	439,297	154	423,642
June	141	300,349	151	416,734
May	167	482,123	152	421,839

Charleston

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
April, 1935	20	48,434	8	20,276
March	15	33,456	8	23,807
February	16	42,673	16	39,011
January	20	54,969	13	34,125
December, 1934	10	25,512	14	34,304
November	16	44,046	10	26,675
October	17	47,331	13	33,850
September	9	22,984	11	32,704
August	13	33,996	12	31,381
July	17	29,729	14	33,845
June	18	46,962	9	22,478

Galveston

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
April, 1935	27	47,580	66	182,502
March	27	50,736	60	164,504
February	19	44,797	57	170,444
January	15	29,620	58	166,087
December, 1934	20	29,298	58	157,843
November	22	43,980	71	255,378
October	16	29,015	70	207,637
August	12	21,967	55	160,727
July	21	33,508	60	163,282
June	25	57,920	71	215,594

Los Angeles

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
April, 1935	214	807,692	209	824,533
March	248	978,707	232	932,392
February	203	782,886	196	788,189
January	199	773,531	196	771,662
December, 1934	239	899,269	222	882,697
November	226	870,032	210	878,186
October	225	856,732	203	825,348
September	214	804,221	197	791,324
August	218	801,482	201	785,671
July	198	710,210	186	755,686

San Francisco

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
April, 1935	161	686,156	176	707,749
March	157	684,905	163	688,194
February	100	609,987	164	669,680
January	142	638,652	162	672,411
December, 1934	152	659,210	154	628,137
November	151	664,456	175	733,150
October	152	670,992	156	663,353
September	146	614,180	160	675,941
August	160	699,105	178	781,553
July	118	484,655	119	471,702

Houston

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
December, 1934	45	159,040	47	166,241
November,	39	143,055	39	139,616
October	43	145,461	41	139,418
September	49	169,676	49	170,694
August	19	76,104	22	88,631
July	24	93,810	24	86,702
June	27	115,730	33	133,108
May	29	109,223	45	132,318
April	31	121,318	40	155,327
March	23	89,200	39	144,546

Note: A complete check-up is being made of each port to make certain that the figures are uniform; that is, that they should represent the number and net tonnage of all vessels entered and cleared in the foreign trade, both direct and via other domestic ports. The following ports are yet to be heard from in this connection: Galveston, Houston and Jacksonville.

Latest Data on New Marine Work

Information on New Ships Ordered—Building and Repair Contracts Let—Sales—Reconditioning—Launchings—Trial Trips

THE current naval appropriation bill reported to the senate, and likely to receive favorable action, includes the necesary funds for laying down the 24 additional naval vessels called for in the next fiscal year's building program. By making available $11,690,000 through reappropriation of unused balances from other appropriations this action of the senate committee makes it possible to award contracts and start building during the summer instead of next winter as suggested by the appropriations committee of the house.

A specific sum of $350,000 was appropriated for the construction of a new ferryboat for the torpedo station at Newport, R. I.

In view of the committee's attitude with reference to the prompt commencement of additional vessels, it is difficult to understand its refusal to authorize the necessary appropriation for the construction of a much needed new model basin for experimental research in naval architecture and aeronautics. The chief constructor of the navy, Rear Admiral E. S. Land, made a vigorous plea for the new model basin, stating that it was the most urgent shore construction proposal of the navy at the present time. It is possible that funds may be made available from the public works fund. Every other maritime nation is better equipped in this respect than the United States.

Orders Diesel Towboat

The United States engineer office, Philadelphia, has awarded contract for the construction of a steel hull diesel drive tug boat to the Alabama Dry Dock & Shipbuilding Co., Mobile, Ala., on its low bid of $47,918. All of the bids received for the construction of this vessel were noted in the May issue of MARINE REVIEW.

This vessel is to be 65 feet, 6 inches in length and will be powered by a Winton diesel engine. Delivery is to be made in 120 calendar days.

Build Cannery Tenders

A speed record, of 5 weeks for construction, is said to have been established by the Maritime Boat & Engine Works, Seattle, for vessels of this type, in building the CORDOVA, an 85-foot, wooden, twin screw, light draft, cannery tender. This vessel was built for the New England Fish Co. and is especially designed for service on the Cordova flats, Alaska. The draft is only 30 inches. She is equipped with two Atlas Imperial diesel engines, each of 80 horsepower. The CORDOVA was 100 per cent complete at the time of launching.

Designed for cannery service in Alaska, the 78-foot diesel vessel QUAKER MAID was launched by Olson & Sunde, Seattle, May 1, for the Nakat Packing Co. This tender has exceptional power for her size, being equipped with one 235 horsepower, 4 cylinder, Washington diesel engine, giving a speed of 11 knots. Both the CORDOVA and the QUAKER MAID were designed by H. C. Hanson, naval architect, Seattle.

Word has been received from the Gulf Refining Co., as of May 8, that up to that time no action had been taken in placing an order for building two tankers, as reported in the May issue.

American Shipbuilding Prospects Improve

In his report to members of the National Council of American Shipbuilders, at the annual meeting held at the Whitehall club, New York City, April 19, H. Gerrish Smith, president, stated that notwithstanding the present low ebb of merchant shipbuilding, there are unmistakable signs of improvements in world shipping which should improve conditions in shipbuilding and ship design in the United States.

These indications are:

1. A substantial increase in foreign trade during 1934 as compared with 1933. Returns for 1934 indicate a combined export and import trade of at least 25 per cent over that for 1933.

2. A notable increase is recorded for traffic through the Panama canal. Commercial transits in 1934 exceeded those of 1933 by 16 per cent. Panama canal net tonnage increased 14 per cent and the increase in cargo tonnage was 23 per cent; while the tolls collected showed an increase of 13 per cent.

3. A marked decrease in idle tonnage is noted. The tonnage of idle world ships at the beginning of 1935 was 26 per cent less than at the beginning of 1934 and 49 per cent less than at the beginning of 1933. While a part of this reduction is due to scrapping laid up tonnage, a considerable proportion, however, is due to re-employment of vessels that had previously been laid up for lack of business.

This improvement in world shipping has been reflected in the shipbuilding industry in foreign countries, but not up to the present time in the United States. Reports as of Jan. 1, 1935 indicate 65 per cent increase in world tonnage of merchant vessels under construction at that time compared with the beginning of 1934. The United States, however, is building less than 2 per cent of the world total under construction at that date.

Officers of the council were re-elected as follows: H. Gerrish Smith, president; Roger Williams, vice president; H. C. Hunter, treasurer and general counsel; and C. C. Knerr, secretary. The following directors were re-elected for a term of two years, expiring March 31, 1937: S. W. Wakeman, Bethlehem Shipbuilding Corp. Ltd.; Robert Haig, Sun Shipbuilding & Dry Dock Co.; H. L. Ferguson, Newport News Shipbuilding & Dry Dock Co.; J. F. Metten, New York Shipbuilding Corp.; L. H. Korndorff, Federal Shipbuilding & Dry Dock Co.; H. F. Brown, The Maryland Dry Dock Co.; C. W. Middleton, The Babcock & Wilcox Co.; and R. B. Mildon, Westinghouse Electric & Mfg. Co.

Plans for Two Vessels

Reports are current that S. Rosoff, who recently purchased control of the Hudson River Night line, is having plans prepared for two new vessels to be built this year and to be ready for service in the spring of 1936.

The three vessels now in commission are being reconditioned and negotiations are also under way with the Hudson River Steamboat Co. for two of its vessels with the view of adding to the fleet of the Night line.

The Bethlehem Shipbuilding Corp., Sparrows Point plant, has received a contract from the Ellicott Machinery Corp. for building a 900 gross tons steel hull dredge.

Vessel Reconditioned for Service to Alaska

Reconditioned at a cost in excess of $100,000, with several Seattle firms participating, including Wallace Bridge & Structural Steel Co., Commercial Boiler Works, and Todd Dry Docks Inc., the steel passenger and freight steamer NORTH SEA has entered the regular service of the Northland Transportation Co., to Alaska.

The NORTH SEA was formerly the ADMIRAL PEOPLES of the Pacific Steamship Co. The vessel now has a cargo capacity of 3700 tons of which 22,000 cubic feet is cold storage space. Accommodations have been installed for 145 cabin and 200 steerage passengers. She will operate on a fortnightly schedule out of Seattle, alternating with the company's steel motorship NORTHLAND.

The NORTH SEA was originally built as the freighter PLAINFIELD, for the Atlantic fruit trade, by the Bethlehem Shipbuilding Co. at Elizabeth, N. J., in 1918. In 1924 she was rebuilt by the Sun Shipbuilding Co., Chester, Pa., for passenger and freight service between Chester, Pa., and Miami, Fla. and was renamed the MARY WEEMS. Three years later she was brought to the Pacific and rechristened the ADMIRAL PEOPLES.

Her principal characteristics are: 3133 gross tons; 1903 net tons; length, 299 feet, 5 inches; beam, 45 feet; and depth, 22 feet, 10 inches. Propelling machinery is a triple expansion engine with cylinders 21½ x 35 x 58 inches in diameter with 42 inches stroke, developing 1700 indicated horsepower.

Dam Contract Awarded

The United States Engineer office, St. Louis, Mo., has been authorized by the chief of engineers, United States army, Washington, D. C., to enter into contract with the Engineering Construction Corp., 10 East Fortieth street, New York, for the construction of dam No. 26, in the Mississippi river at Alton, Ill. The contract amount is $4,865,716.80 and the time of completion will be 785 days from the time of receipt by the contractor of notice to proceed.

The dam will consist of 30 Tainter gates and three roller gates. The Tainter gates will be 30 feet in height and 40 feet in length and the roller gates 25 feet in height and 80 feet in length. The gates are to operate between concrete piers. All Tainter and roller gates are to be raised and lowered with chains operated by electric hoists. The total length of the movable section of the dam is to be 1724 feet.

To Build New Liner

The Holland-America line has announced the building of a new liner, of over 30,000 tons, for its transatlantic service, to be ready for the season of 1937.

The new ship, which is being undertaken because the management believes that the business of the line justifies this addition to the fleet, will become the flagship, and is to surpass the STATENDAM in size, speed and accommodations.

It is interesting to note that the new vessel will be the first one for this line to be built in Holland. She will have accommodations for 400 passengers in first class, over 600 in tourist class and more than 400 in third class.

Dry Dock Sold for Scrap

Built more than 20 years ago by the Seattle Dry Dock & Construction Co. and having outlived its usefulness, the 12,000-ton steel dry dock, one of three at the Seattle plant of the Todd Dry Dock Inc. has been sold to Seattle interests for scrapping. It is estimated that 1800 tons of scrap will be salvaged. Definite plans for replacing this dry dock have not been announced, but it is understood that an existing dock will be acquired instead of building a new one.

The Turcenio Towing Co., Philadelphia, has requested bids for the construction of a tug.

Big Floating Dry Dock to Be Built for Hawaii

Bids for the construction of a $10,000,000 floating dry dock for Pearl Harbor, T. H., Will be requested from Pacific coast shipyards.

Lieut. Commander P. J. Searles, of the civil engineering corps of the navy, who has been appointed public works officer stationed at the navy yard, Pearl Harbor. on his arrival at Los Angeles enroute to Honolulu said:

"The proposed dry dock, one of the largest ever built, cannot be towed through the Panama canal. For this reason it probably will be built on the West coast. It will be the first important piece of American naval construction built in Pacific waters for some time."

This reference to naval construction on the Pacific coast evidently refers to private shipyards as there are now under construction several naval vessels in navy yards on this coast.

It is understood that the design of this mammoth floating dock, which is to be about 1000 feet in length, is now underway at the navy department, Washington, under the direction of Lieut. Commander William H. Smith of the civil engineering corps of the navy, and that bids for its construction will be requested from Pacific coast shipbuilders sometime in September.

Bids will also be submitted, it is understood, by Pacific coast shipyards for the building of a smaller floating dry dock, also for Pearl Harbor, at an estimated cost of $750,000.

Contract for reconditioning the lighthouse tender CROCUS was awarded to the Buffalo Dry Dock Co., Buffalo, in the estimated amount of $43,529.

The United States engineer office, Memphis, Tenn., has awarded contract to the St. Louis Shipbuilding & Steel Co., St. Louis for the construction of one 60-foot steel whirler derrick hull complete, on its low bid in the amount of $7940.

Bunker Prices

At New York

	Coal F. a. s. per ton	Fuel oil alongside per barrel	Diesel engine oil alongside per gallon
May 20, 1935	5.80@5.55	1.20	4.65
April 19	5.63@5.38	1.20	4.65
Mar. 19	5.63@5.38	1.20	4.65
Feb. 19	5.63@5.38	1.20	4.65
Jan. 19	5.63@5.38	1.20	4.65
Dec. 19, 1934	5.63@5.38	1.20	4.65
Nov. 19	5.63@5.48	1.20	4.65
Oct. 19	5.63@5.48	1.20	4.65
Sept. 19	5.63@5.48	1.35	4.79
Aug. 18	5.63@5.48	1.35	4.79
July 19	5.63@5.48	1.35	4.79
June 19	5.63@5.48	1.35	4.79

At Philadelphia

	Coal trim in bulk per ton	Fuel oil alongside per barrel	Diesel engine oil alongside per gallon
May 20, 1935	5.10@4.85	1.20	4.61
April 19	4.93@4.68	1.20	4.61
Mar. 19	4.93@4.68	1.20	4.61
Feb. 19	4.93@4.68	1.20	4.61
Jan. 19	4.93@4.68	1.20	4.61
Dec. 19, 1934	4.93@4.68	1.20	4.61
Nov. 19	4.93@4.78	1.20	4.61
Oct. 19,	4.93@4.78	1.20	4.61
Sept. 19	4.93@4.78	1.35	4.76
Aug. 18	4.93@4.78	1.35	4.76
July 19	4.93@4.78	1.35	4.76
June 19	4.93@4.78	1.35	4.76

Other Ports

May 20, 1935

Boston, coal, per ton	$7.73
Boston, oil, f. a. s. per barrel	$1.16
Hampton Roads, coal, per ton, f.o.b. piers	$4.92
Cardiff, coal, per ton	13s 6d
London, coal, per ton	—s —d
Antwerp, coal, per ton	16s 9d
Antwerp, Fuel oil, per ton	—s —d
Antwerp, Diesel oil, per ton	—s —d
British ports, Fuel oil	—s —d
British ports, Diesel oil	—s —d

New Bulkhead System Tested, for Oil Tankers

BY E. C. KREUTZBERG

IN THE presence of a large group of naval architects, marine engineers and marine insurance experts, including high officers of the United States navy, Lukens Steel Co., Coatesville, Pa., on May 21 successfully demonstrated the strength of its new type of welded steel plate bulkhead construction for oil tankers.

In this system, the complete bulkhead is composed of a series of pressed plates, joined into a single unit by welding. Each compressed plate combines two elements, an elliptical bulge and one-half of a channel-shaped member. The channel-shaped member is completed when two pressed plates are welded together.

The elliptical bulge transmits its share of the fluid pressure load to vertical webs by a complicated form of hoop tension. The channel transmits a share of the fluid pressure load to the same vertical web and preserves the transverse continuity essential for whatever diaphragming action may be necessary.

Bulkheads constructed by this system, the company estimates, will weigh about 26 per cent less than conventional bulkheads, with an accompanying reduction of about 30 per cent in the stiffener area and of about 32 per cent in the number of parts required in constructing the bulkhead. It reduces by about 61 per cent the number of parts to be assembled by the shipyard and by about 51 per cent the amount of welding to be done at the shipyard.

The cost of this proposed bulkhead system for tankers is said to approach or be less than the cost of conventional riveted bulkhead systems. Exact cost will depend on the number of dies required to produce the sizes of pressed steel bulge plates which will be specified by the naval architect for each particular job.

"To give some idea of the utilization of these plates in a proposed all-welded tanker," states the company, "it is to be noted that about 1050 separte buckle plates of possibly two or three sizes will be required. The boat under discussion is 495 feet long, with a tank capacity of about 5,530,000 gallons."

The test model was built on a ⅜ scale. It consisted of six buckle plates, all formed of 3/16-inch mild steel plate, three at the front and three at the rear. They were welded together, thus forming three convex bulges and two channels at the front and three concave bulges and two channels at the rear. The front and rear assemblies were held together at sides, top and bottom by plates 4½ inches wide, all joints being welded. The model was covered with whitewash so that when failures occurred they might be located by the flaking off of this coating.

Using a tall chimney, the company employed a head of water to test the tank. The first distortion did not occur until the pressure had been increased to 80 feet head, about three times the actual head in tanker construction. This initial distortion showed up in the form of a slight bulge in the rear channels and a slight bulge in the top rear panel. As the head was increased, the bulges became more pronounced and, at 131 feet, the rear plates and channels all bulged badly. At this pressure, which was all that the company was prepared to develop, the model showed no leakage. All of the welds, of course, held perfectly.

"Heretofore, the typical bulkhead really has consisted of two parts—that separating the two adjacent compartments and that which stiffens the first and makes it capable of resisting water pressure on one side," says the company in reference to its new design. "The proposed construction combines in largest degree these two functions. Thus, all the usual horizontal stiffeners are eliminated and the lateral stiffness is preserved by the integral channels."

The new buckle plates are pressed in individual dies at the Lukens plant and are trimmed to size. The practice will involve welding them together in the shop into units convenient for shipment to the shipyard.

Naval Architects Meet

The Society of Naval Architects and Marine Engineers was to hold its spring meeting at 29 West Thirty-ninth street, New York City, on May 28. Two papers were to be presented, one before and one following an informal dinner at 6 p. m.

The two papers are: *Yacht Measurement, Origin and Development*, by W. P. Stephens, member; and *The America's Cup Defenders*, by C. P. Burgess, visitor.

Mr. Stephen's paper discusses measurement as the governing factor in yacht design, beginning with tonnage as first applied to the British navy and merchant marine and later to yachts, tracing the development of the narrow cutter in Great Britain and America, and its replacement by a compromise type under more modern yacht rules. He describes the developments of the great racing machine such as INDEPENDENCE and RELIANCE and the return to a more normal type under the international and universal rules now in use.

In the paper on *America's Cup Defenders*, Mr. Burgess discusses the present measurement formula for the America's cup yacht. It is pointed out that this formula taxes the sail area and the ratio of the length to the cube root of the displacement, but not the absolute size within certain limits.

A method is described for determining from towing tank tests the best size of yacht for a given assumed speed.

Subsidy Bill is Modified After Senate Hearings

The senate committee's bill on the merchant marine, covering among other matters ship subsidy legislation, construction loans and the establishment of the necessary organization for its administration, after many hearings and numerous modifications, was expected to be reported out of committee on May 22.

In the matter of construction loans an affirmative vote of four members of the proposed five-man maritime authority would be required under an amendment which was adopted. To complete the senate committee's bill, only an agreement in the wording of an amendment as a safeguard against any possible collusion in bidding for construction contracts remained to be settled.

The bill, as now virtually ready for submission to the senate, authorizes the President to substitute direct subsidies in place of the present mail pay and carries a revised section covering adjustment of the 43 existing mail contracts. It was held in Postmaster General Farley's reports, dealing specifically with each of these contracts, that 42 may be cancelled because they were not entered into in strict compliance with the law. No new mail contracts can be entered into under the revision suggested by the post office department.

Senator Copeland pointed out that the bill provides for the construction loan feature in place of the plan suggested by Alfred H. Haag, chief of the division of research of the shipping board bureau by which the government would construct the vessels and then sell them to the shipowner at the foreign cost on a 20-

(*Continued on Page* 49)

HIGH PRESSURE BOILER

Service and Trial Results Favorable

IN A SYMPOSIUM on high pressure boilers presented at a meeting of the Institute of Marine Engineers, held in London, March 12, the noted German engineer, E. Goos, presented the case of the Benson type of super pressure steam boiler. His paper, with illustrations, was published in the April transactions of the Institute. A full abstract from this paper follows:

The only super pressure steam boiler installed on a merchant vessel up to the present time, as far as is known, is the Benson boiler, designed and constructed by Blohm & Voss, Hamburg. The boiler has now been in continuous service on the S. S. UCKERMARK for about four and a half years, and has worked to the entire satisfaction of all concerned.

In view of this the Hamburg-American line decided to install four Benson boilers in the new turbine electric drive ship, building by Blohm & Voss for its service to the Far East.

The Benson boiler consists entirely of tubes and has no drums. It is therefore particularly suitable for shipboard use. It has a comparatively large combustion space, entirely surrounded by tubes through which water passes in continuous flow. The heat transmission from gas to water or steam in the radiation part as well as in the convection part of the boiler can be exactly calculated. It is therefore possible to determine where salts or other impurities of the boiler water are deposited.

Preventing Scale Formation

The temperature of the combustion gases in this part of the boiler must be low to prevent the formation of hard scale inside the tubes. By this simple measure it is possible in the case of a leaky condenser to maintain full power for several hours without danger of tube failures. Since, also, the working principle of the boiler prevents priming, it can be considered especially suitable for marine purposes.

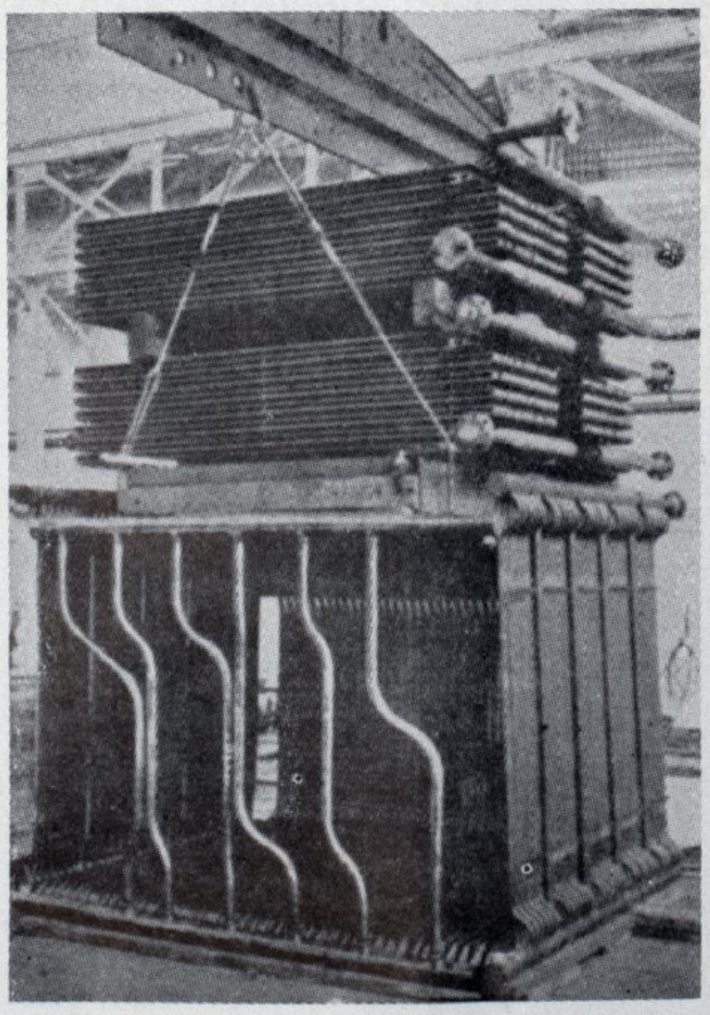
Originally the Benson boiler on the UCKERMARK worked at the critical pressure, but it has been shown that the boiler can also be worked at variable pressures as long as the conversion zone is situated in the region of low gas temperature. On this account the boiler pressure is virtually subject to no practical limitations and may be kept as high as 3000 pounds per square inch. The temperature of the superheating steam is automatically kept constant, and is, due to the limitations of material available, limited to about 900 degrees Fahr.

The weight of one of the Benson boilers to be installed in the new liner is only three tons, and the space is 100 cubic feet per ton per hour of steam at 1500 pounds pressure and 900 degrees Fahr. In special cases where the saving of weight and space is of vital importance, these values can be reduced to 0.7 ton and 35 cubic feet respectively.

The combustion space is rectangular which facilitates the mixture of the highly preheated combustion air and the atomized fuel; hence the combustion at all loads is complete and nearly smokeless. With properly arranged high class oil burners, 340,000 B.t.u.'s per cubic foot of combustion space can be generated and 260,000 B.t.u.'s per square foot of radiation surface have actually been transmitted.

The tubes of the combustion space are of special steel containing 0.4 per cent molybdenum; their diameter is 1 inch and thickness 5/32-inch. The number of tubes in one nest depends upon the capacity of the boiler. The tubes or coils are welded on to upper and lower headers, each upper head being connected to the following lower head by one downpipe of suitable diameter. Air trunks around the boiler carry the combustion air from the pocket type air heater to the oil burners. Because of this arrangement the boiler does not require elaborate insulation.

At the works of Blohm & Voss, one Benson boiler has been tested under conditions approximating the severest seagoing service. It has been demonstrated that the boiler is capable of responding immediately to the required alterations of the load. Maneuvers of the turbine from stop to full ahead and vice versa can be carried out in a few seconds.



Benson boiler erected in the shop

High Boiler Efficiency

The fuel pumps were regulated by the thermometer for superheated steam and relays, the number of burners, the feed pumps and the boiler fans being hand regulated. Test results show that all the interdependent data, steam pressure, steam temperature, etc., are subject to little variation and only within the limits permitted. The efficiency was very good being on an average 90 per cent, the same as that obtained on the UCKERMARK.

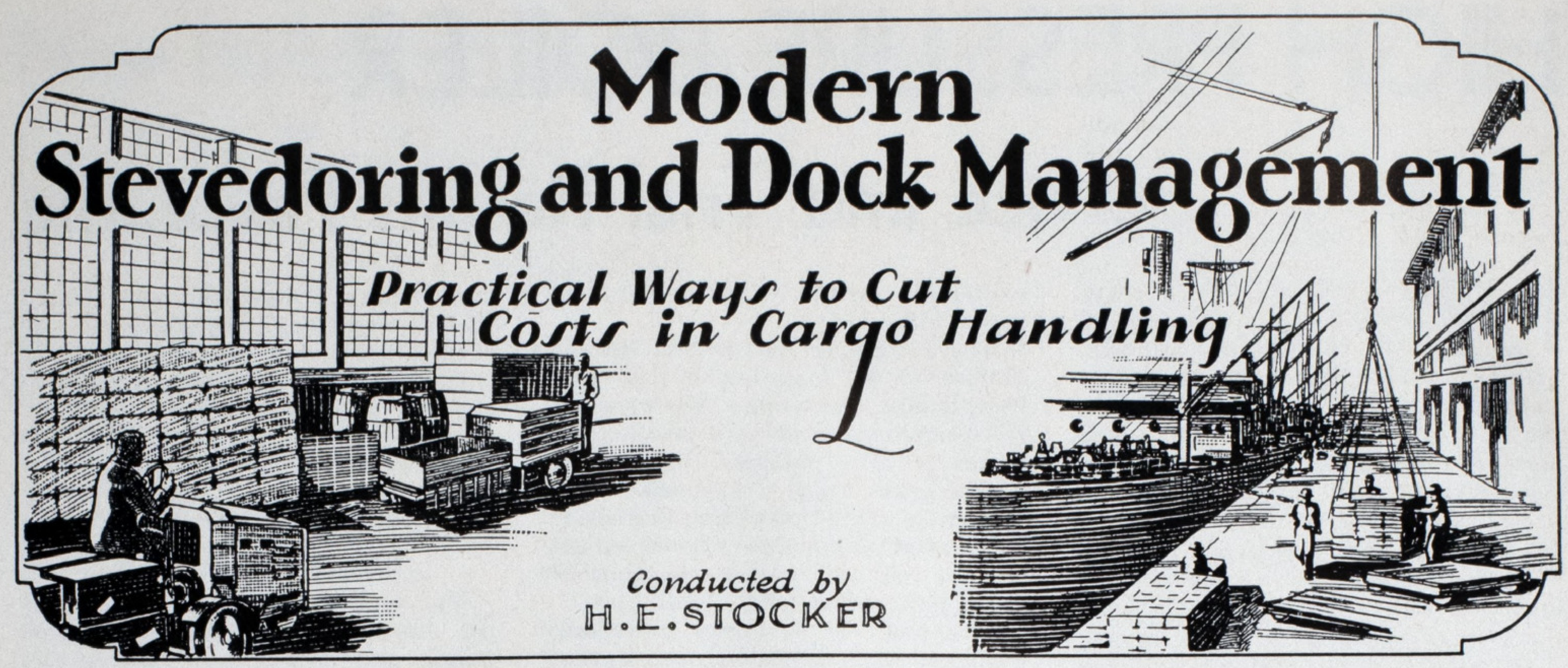
The tubes can be kept clean easily by steam blowers. The oil burners used were of Blohm & Voss design, ranging in capacity from 100 to 1700 pounds per hour. The combustion was nearly smokeless at all loads and the CO_2 content of the combustion gases was 14 to 15 per cent.

From these tests the Hamburg American line has every reason to anticipate that the Benson boiler will work as satisfactorily on the new ship as it did on the UCKERMARK and more recently in the shop. As the machinery of this ship has many additional new features her voyage results will be awaited with the greatest interest.

In the discussion which followed the reading of the paper, several questions were raised. We shall consider two of these; first cost, and the possibility of boiler explosion.

In regard to first cost the author pointed out that the Benson boiler due to the absence of expensive drums, will compare most favorably in the matter of low price. He also emphasized the importance of simplicity and that in this respect the Benson boiler could not be surpassed.

With reference to the danger of boiler explosion, the author said that in the Benson boiler no explosion is possible because the water storage capacity is so small that in the case of a tube failure no damage could be done. Repair of tubes can be carried out very quickly since the heating surface is composed of a number of elements that can be taken out separately and are readily accessible.



Modern Stevedoring and Dock Management

Practical Ways to Cut Costs in Cargo Handling

Conducted by
H. E. STOCKER

How Mechanical Equipment is Used for Efficient Cargo Handling

By Gerard E. Mc Namara

UNDER the management of the Associated Operating Co., Pier 3 Bush docks, at the foot of Forty-eighth street, Brooklyn, in New York harbor, serves the vessels of the Java-New York line, the Blue Funnel line, and the American-Indian line, and also handles an occasional ship destined for East and South African ports. Approximately 300,000 tons of cargo move across this pier annually.

Among the commodities handled at Pier 3 are flour, kapok, sisal tow, rubber, burlap, paper, machinery, drums of powdered and liquid commodities, steel pipe, fragile and refrigerator articles, steel shapes, boxed automobiles, and many other items. These numerous articles are packed in a variety of bales, bags, boxes, bundles, barrels and drums and some are shipped without any packing. To handle such a quantity and variety of freight speedily and economically, requires efficient materials handling methods and terminal management.

Layout of the Pier

The pier is of wooden construction, and is 1338 feet long and 150 feet wide, with a floor space of 200,700 square feet. The apron on the pier is about three feet wide including a raised stringpiece one foot high. The pier is entirely covered by a wooden shed. Down the center the floor boards are laid lengthwise, giving a smooth runway, about 30 feet wide, for the speedy operation of the electric crane trucks. The floor boards on either side of this runway are laid diagonally. The entire floor is kept clear and in good condition.

A single railroad track set flush with the wooden floor runs down the center but is seldom used. Most of the cargo handled is delivered via motor truck, barge and lighter. Only an occasional railroad car of freight is delivered directly to the pier.

Cargo handling costs represent a large percentage of operating expense. Intelligent use of mechanical equipment will reduce these costs.

The equipment used in the handling of cargo on Pier 3 consists of six electric driven crane trucks of various types and capacities. Three of these are 3000 pound capacity lift trucks with crane attachments. The three others are newer type crane trucks with a capacity of 6000 pounds, at a speed of from seven to eight miles per hour loaded and of ten to twelve miles per hour light.

Electric Crane Trucks

All of these trucks are four wheel drive, four wheel steering and are equipped with rubber tires and roller bearings. The crane attachments for two of the lift type trucks have stiff leg booms which are not moved. The other of these trucks has a topping lift boom with a 6-foot telescopic extension. The three newer type of machines have a topping lift and a 6-foot telescopic extension on the boom. Four wheel steering gives good maneuverability in restricted places. The trucks are equipped to run in either direction, thus eliminating delays when working in dead alleys. They have a short turning radius. The lift truck will turn in a radius of 6 feet 8 inches, while the crane trucks, which are slightly larger than

The crane truck sometimes accumulates drafts of cargo faster than the ship's gear can handle them

standard size, have a turning radius of 7 feet 2 inches.

Use of portable crane equipment on the pier keeps the aisles relatively clear of traffic. All drafts are made up at the piles on the pier and brought to shipside ready for hoisting. Motor trucks entering the pier deposit their freight on the floor out of the way of the electric crane trucks. The motor trucks are quickly unloaded because it is not necessary to unload at a specific point in order to be near any particular hatch. The electric crane trucks can make rapid long hauls from any point of the pier shed to ship side.

Rope, net and chain slings are used. Slings of the appropriate type are laid out on the deck of the pier and the freight is rolled, toppled or placed in the slings. This method requires but a minimum of lifting.

Rope slings are used frequently with this crane truck operation. Large cases of various shapes and sizes are easily handled by carrying them on the crane hook.

One Crane per Hatch

One electric crane truck per hatch is ample to move the freight as fast as it can be stowed. In many cases drafts are accumulated ahead of the ship's hook in the shed doorway. By accumulating several drafts ahead when running on short hauls, the truck can make longer hauls without keeping the ship's hook waiting. Complete drafts accumulated in the doorway are thus ready at all times to be lifted with the ship's tackle.

In handling steel pipe with trucks one rope sling is used with the pipe held lengthwise alongside the truck. In lifting the pipe over the side of the ship, however, better control is possible by the use of two slings spaced several feet apart and meeting at the ship's hook.

The use of electric crane trucks has simplified handling heavy cases. A special grab is attached to the crane hook. This grab consists of a rope sling, to which are attached two pronged hooks curved to fit snugly on the corners of the case. As the crane lifts the case a dolly is placed under it. The crane truck then pulls the case on the dolly to shipside. Three men, including the crane driver are used in this operation as against eight to ten without mechanical equipment.

The heavy duty dollies in use all have six-wheels. Some of the older dollies have heavy wooden frames, but the newer type are of steel.

Buckets for Small Parts

Steel springs, and other small commodities shipped loose, are handled in large steel dump buckets. These buckets are fitted with four steel caster-type wheels. On one side the bucket is sloped outward to facilitate dumping. Small loose cargo, is placed in the bucket by hand. An electric crane truck takes the bucket to shipside to the ship's gear for lifting over the side. On arrival in the hold, the bucket is wheeled to the point where the cargo is to be stowed.

Standard stevedore's barrel slings are used for handling steel drums, wooden barrels, and similar cargo. A large steel ring is hooked onto the crane truck hook. From this ring are suspended four endless steel chains, on which there are two hooks. The hooks are placed over the ends of the drums or barrels and engage the chimes.

The crane truck picks up four units and takes them to shipside. Here the crane truck drops the draft but retains the sling and returns to the pile for another load, and the ship's hook, also fitted with a sling lifts the draft overside.

Crane Trucks Tier Freight

The electric crane trucks are used to good advantage in piling freight accumulated on the pier before the ship is ready to load, and also in piling freight that is being discharged. In this way the cost of piling is greatly reduced and the trucks are kept busy when they might otherwise be idle awaiting the vessel.

Bales of burlap, each weighing approximately 1200 pounds, are stacked five high on the flat by using cranes. Bales of old newspapers are stacked six high, with a great saving in space. Small cases of tinned cereal are piled 12 high, as are bags of tapioca flour and other similar commodities. Bags of seed are piled 14 high and bales of kapok 10 high.

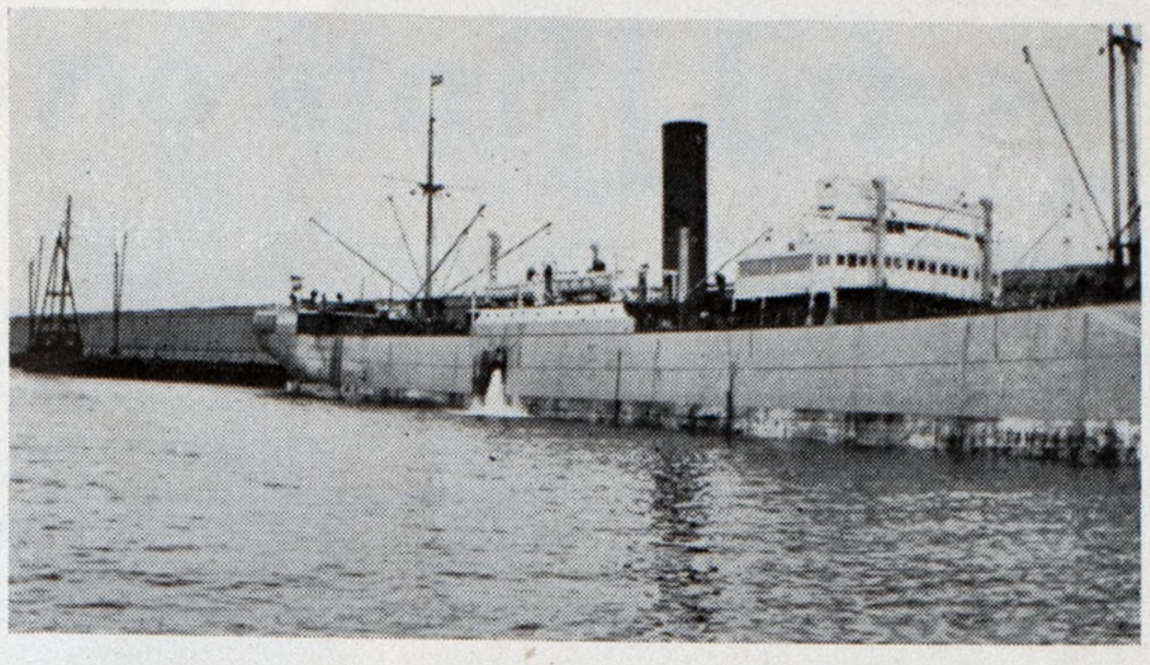
The efficiency of the electric crane trucks is appreciated when one considers the labor involved in tiering by hand. In this operation even the ordinary hand truck saves labor.

To tier freight above man high to save space is costly. The tiering must be done on the pyramid plan, with the ledges or steps about four high. The men must stand on these different ledges and pass the packages from one level to the next. Two men are used at each level if the packages are at all heavy. This method is very wasteful. If storing of marks is necessary, the men doing the high piling for different marks cannot be kept busy continuously, because of the necessity of having men available for high stacking at each of the different piles. The men cannot be readily shifted from pile to pile as the freight coming out of the ship changes from mark to mark.

Because of the different levels on which the men stand in piling, the face of the cargo is not vertical but is made up of a series of steps having a general incline of about 45 degrees. Every additional step in the height of the pile requires additional laborers and as many handlings as the pile is high. Manual lifting above a height of about five feet means a considerable increase in handling expense. By the hand-tiering method the pier space is not fully utilized.

Cargo is usually piled from 12 to 18 feet high, but, subject to certain restrictions as to weight, etc, it can be piled to about 20 or 22 feet.

The cargo handling operation on Pier 3 is notable for the effective use of mechanical equipment. The pier operating staff understands its use.



S. S. Palembang docked at the inshore berth at Pier 3, Bush Docks

Open storage space at the offshore end of Pier 3, Bush Docks

Useful Hints on Cargo Handling

WHEN handling heavy bales and packages onto motor trucks, a wooden ramp may be placed from the tailboard of the truck to the deck of the pier, and the packages wheeled up this ramp on hand trucks. In order to keep the ramp from sagging in the center, under the combined weight of the loaded hand truck and the men pushing it, a large-wheel hand truck is placed under the center of the ramp in such a manner that the under part of the ramp is touching the top part of the blade and the handles of the hand truck. The hand truck placed in this position supports the ramp rigidly.

Cargo Handling Executive

CONSIDER the handling of soda ash. The cargo handling executive would be familiar with the difficulties in handling this commodity. He would know the character and amount of claims and would know or determine the best method of handling soda ash, so that it would be possible to handle this commodity economically and with the minimum of claims.

This man should meet frequently with the traffic executives and freight solicitors so that full discussion could be had on improving service, increasing business and cutting costs. The longer these meetings were continued, the more effective the whole organization would bcome.

A cargo handling executive would be a valuable aid in many companies in removing restrictions imposed on handling certain cargoes by the operating department.

In the next few years, profits will be found largely in cutting costs in every conceivable manner compatible with getting the business. Many opportunities formerly too small to be given consideration will be availed of, but the maximum savings and the maximum traffic will not be obtained unless effective co-operation of the traffic and operating departments is achieved.

From Lighters to Ship

IT FREQUENTLY happens that lighters arrive with cargo for a ship while other lighters are being worked offshore to the ship. In some cases the later arrivals dock at the pier, either fore or aft' of the vessel, and truck the freight to shipside.

THIS page is being devoted to short items on all matters having to do with the more efficient turn-around of ships. These items are intended to be of a helpful nature.

We will welcome for this page brief descriptions, illustrated if possible, of any better or safer way of performing any function in cargo handling. Also, any questions submitted will be answered by the editor.

Sometimes, however, the area immediately surrounding the various working spaces are stowed full, in which case a long haul around the piles would be necessary. In such instances, it is much better to moor the lighters on the opposite side of the pier and truck the freight across to the shipside.

Small carts for handling refuse material on the piers can be made from spare parts usually to be found lying around idle in the gear shed. A wooden box, supported in the center on two large wheels, with a smaller one at the front end, and fitted with a handle at the rear, makes an inexpensive but useful cart for the handling of such junk. It can easily be wheeled from place to place. The carts should be provided with a good stiff broom and a shovel.

Keep Passengers off Pier

ONE steamship company solved the problem of getting its passengers and visitors to the ships without the necessity of their entering the pier itself and getting in the way of stevedores loading the cargo. A waiting room was built in the upper part of the ship at the inshore end of the pier. From this waiting room, which is equipped with comfortable lounges, information and ticket desks, sanitary facilities, etc., a long covered and lighted ramp extends along the roof to about the middle of the pier. Here the passengers and visitors go down a short stairway to reach the gangway.

When the vessels are ready to sail, the visitors are permitted to go directly to the pier level, via a flight of steps which is near the gangway, to see the ships off from the offshore end of the pier. By this time the longshoremen have finished their work and have left the pier shed, and the visitors are not exposed to either the danger of injury or interference with the work of the stevedores.

When handling rubber or fabric hose over the side of a ship it is wise to keep it clear of the cutting edge of the ship. This can be done by placing dunnage between the hose and the edge, or, better yet, by rigging up a block and tackle arrangement to keep the hose clear of the edge.

Much time is saved in the freight departments of steamship companies on busy days if the cubing of measurements is done on the piers. This work is usually performed by the checkers on the pier and office copies of the dock receipts.

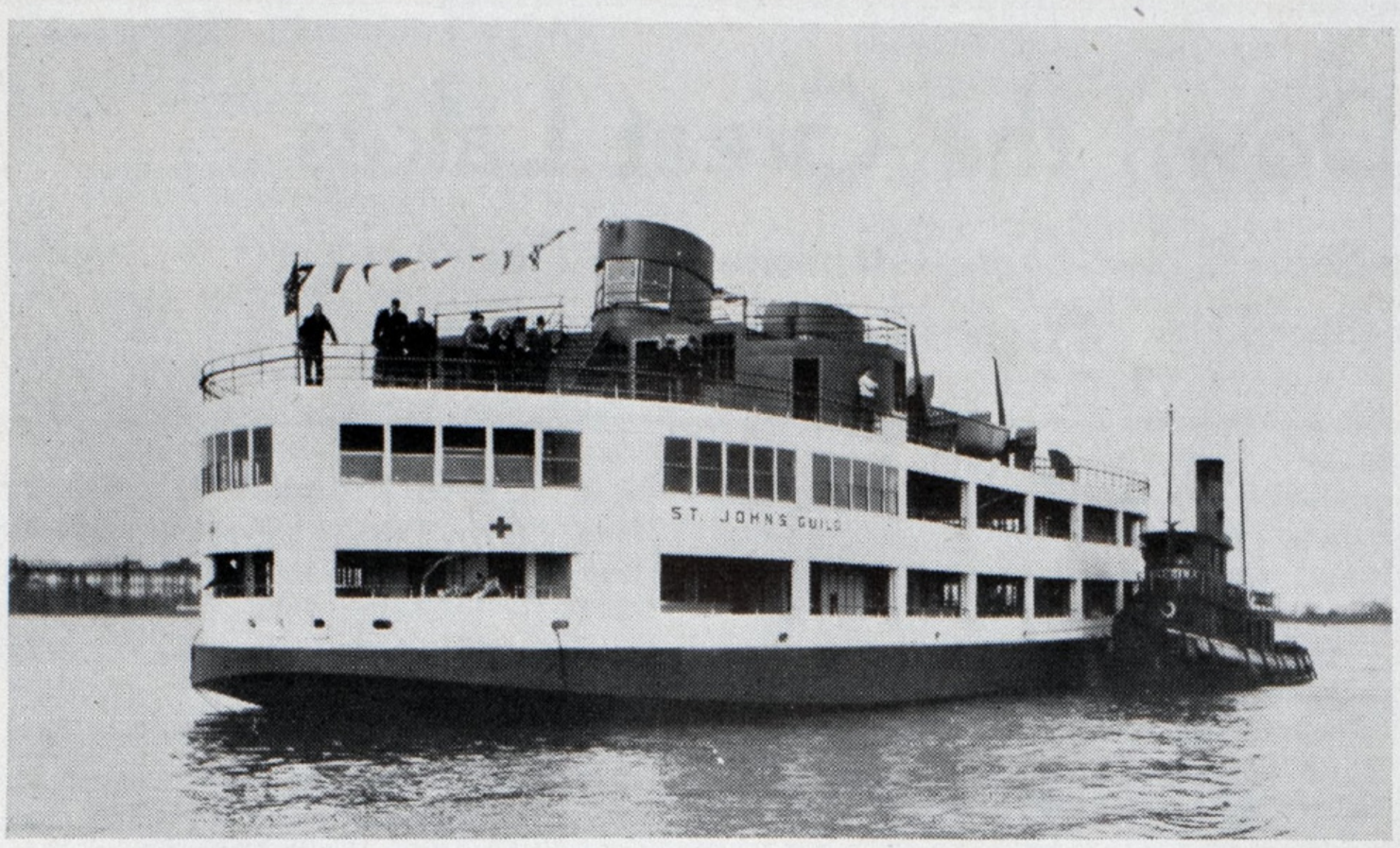
Preventing Pilferage

LOSS of cargo from piers through pilferage can be minimized by applying the system of checking used on New York piers. All trucks entering the terminals are given slips of paper on which is noted the number of packages on the truck on the way in, the number to be dropped and picked up, and the number which should be on the truck when it leaves the shed.

Proper vigilence on the part of both checkers and watchmen in the handling of these slips will prevent any packages other than those intended from leaving the pier shed.

On steel decked ships, sections of the wooden hatch covers placed on the deck between the hatch coamings and the outside of the ship provide a safer footing for the signal man and partially solves the problem of where to stow the covers when the hatches are open. On wooden decked ships, these hatch covers serve to protect the wooden deck from contacts with drafts of cargo.

The use of "commonsense" is one of the most effective weapons in the prevention of accidents to both personnel and equipment. This applies to managerial policies as well as to individual practices.



New floating hospital for St. Johns Guild, New York. Built by John H. Mathis Co., Camden, N. J. Launched April 6

Hospital Ship Incorporates New Features of Design

THE new, all steel, fire proof, unsinkable, non-self-propelled, floating hospital of St. Johns Guild, New York city was launched at the shipyard of John H. Mathis Co., Camden, N. J. on April 6, as reported in the May issue.

The new floating hospital, as yet unnamed, will be towed to New York, leaving Camden May 25; the date of arrival depending upon sea, wind and fog. The christening ceremonies are expected to take place June 9 at the Battery, New York city. The object of the service of St. Johns Guild is to afford relief to the sick children of the poor of the city of New York without regard to creed, color or nationality. "For nearly 60 years," said an editorial in the *New York Herald Tribune*, "the floating hospital of St. Johns Guild was a familiar sight in New York harbor. Last year it was necessary to suspend this unique service . . . The old boat had come to the end of its day."

The new vessel which was designed by George G. Sharp, naval architect, New Yory city, presents a graceful appearance with her terraced superstructure decks and rakish oval houses on the boat deck. Her principal dimensions are: Length overall, 181 feet, 4 inches; maximum breadth, 49 feet, 4 inches; depth of hull, 11 feet; and depth to top of boat deck amidships, 33 feet. The approximate passenger capacity is 1500.

The main hull is divided into nine equal watertight compartments, arranged as follows: 1. Fore peak and chain locker; lower deck flat the following: 2. refrigerated; 3. galley, pantry and crew's messroom; 4. children's bath room; 5. children's bath rooms; 6. boiler room and auxiliary engine room; 7. crew's quarters; 8. tank space; and 9. after peak.

The side hulls, port and starboard, are divided into 16 watertight compartments.

Administration offices are arranged on the main deck forward. Forward on the terraced main deck are located, dining room, housekeepers room and superintendents room and lavatories The clinic, treatment room, waiting room, rest rooms and childrens' lavatories are located in the central portion on the same deck. The after part of this deck is arranged as a large childrens play deck with lavatories adjoining.

All around the vessel, outside the terraced main deck, runs a 10-foot wide promenade with seating arrangement for deck chairs. This promenade deck is glass enclosed at the forward end.

Upper Deck Arrangements

Over the forward and center portions of the terraced upper deck is a large dome with a moving picture screen at its forward end. Seating arrangements can be made on this deck for an audience of about 1000 persons. The terrace also affords a dancing floor of 4000 square feet. The after end of the upper deck is arranged as a babies' nursery with lavatories adjoining. At the forward end of the upper deck there is a milk booth, complete with refrigeration equipment. All around the terraced upper deck is a 10-foot wide promenade with the forward end glass enclosed and forming a large veranda. Terrace and side decks are arranged for deck chairs.

The terraced boat deck is arranged for deck chairs. The officers deckhouse is located on this deck forward of the dome. The lifeboats and life rafts are installed on this deck at the sides. Aft of the lifeboats there is a 10-foot wide, open promenade around the boat deck. Above the officers' deckhouse is a spacious navigating and observation bridge. Oval houses have been built above the boat deck forward for chart room and pilot house in the forward part and living room and camera room in the after part.

New Structural Features

Advanced structural engineering methods have been applied throughout the construction of the steel hull and superstructure, combining strength with lightness and pleasing appearance. The whole superstructure is supported on a system of widely spaced main frames and columns. The columns also serve as ducts for mechanical ventilation to all compartments.

The watertight subdivision is more complete than that of any passenger carrying craft afloat. Continuous longitudinal bulkheads in main and side hulls divide the vessel into 25 separate watertight compartments so that the vessel will stay afloat even after the most extensive damage to the hull structure.

Several examples are given below to show the number of compartments which can be destroyed without submerging the vessel below the margin of safety line:

1. The vessel will stay afloat with every watertight compartment throughout the length of the main hull opened to the sea, the entire bottom of the main hull being destroyed.
2. The vessel will stay afloat with all side compartments opened to the sea; in other words, with either port or starboard sides entirely destroyed.
3. Vessel will stay afloat with six end compartments or ten middle compartments destroyed.
4. The vessel may be cut in two at any point of her length except extreme ends and both severed portions of the hull will stay afloat and stable.

Lifesaving equipment, consisting of lifeboats, life rafts and life belts, is fully installed in accordance with steamboat inspection rules and regulations. The greatest care has been taken to protect the vessel against fire. The entire hull and interior accomodation structures are built of steel. The interior is completely fireproof. Furniture and other equipment is of steel and aluminum. Fire fighting equipment has been installed throughout in accordance with the rules and regulations of the steamboat inspection service.

Up and Down the Great Lakes

Traffic at the Soo—Ship-to-Shore Telephone—Ore Fleet and Shipments—Lake Levels—Cuyahoga Dredging

FREIGHT passing througs the Soo locks in April exceeded that of last year by 875,395 tons, according to the first report for the 1935 navigation season. The movement through the locks during April, 1934 was 12,897 tons of freight as compared to 888,292 tons this year. The canal, this year, however, opened April 16 which was 13 days earlier than last year.

Shipments through the canal during April were as follows: 297,275 tons of iron ore, 339,460 barrels of flour, 2,687,439 bushels of wheat, 683,000 bushels of other grain, 1139 tons copper, 2440 tons of pig iron, 1551 tons of structural steel, 6843 tons of stone, 23,856 tons of general merchandsie, 399,745 tons of soft coal, 2777 tons of salt and 15,446 tons of oil. There were 8 passengers during April.

Ship-to-Shore Telephone

The new ship-to-shore telephone service, started May 4, 1934 by the Lorain Radio Corp., Lorain, O., has proven to be a satisfactory form of communication on vessels of the Great Lakes.

The first vessels to use this service were the WILLIAM C. ATWATER and the JAMES MACNAUGHTON of the Wilson Transit line. The W. G. MATHER, flagship of the Cleveland-Cliffs line is being similarly equipped.

The cost for installing this equipment on board a vessel is said to be about $2000. This service makes possible communication by telephone from any ship so equipped, if within range of the shore station, to any telephone in the United States, Canada or Mexico.

The Ore Carrying Fleet

Six vessels have been eliminated and one added to the ore-carrying fleet on the Great Lakes, according to a compilation made by the M. A. Hanna Co. There are 324 vessels of a total trip capacity of 2,711,300 tons in 24 American fleets available for this trade this season, while last year there were 329 vessels with a total trip capacity of 2,753,800 tons.

The vessels eliminated are: the FITCH, which has gone into the automobile trade; the MAYTHAM, into the stone trade; the J. J. BARLUM and the THOS. BARLUM, to Canadian registry; and the W. A. REISS and the CALLENDER, lost and abandoned. The only gain was the TRISTAN, transferred from the pulpwood to the ore trade.

The Pittsburgh Steamship Co. with a total of 86 vessels, has 42 in commission, 30 of which have already gone out, the remaining undergoing outfitting for service when ready.

April Lake Levels

The United States Lake survey reports the following monthly mean stages of the Great Lakes for the month of April, 1935, determined from daily readings of staff gages.

Lakes	Feet above mean sea level
Superior	602.34
Michigan-Huron	578.05
St. Clair	573.26
Erie	570.24
Ontario	243.74

Lake Superior was 0.09 foot higher than in March and it was 0.18 foot above the April stage of a year ago.

Lakes Michigan-Huron were 0.27 foot higher than in March and they were 0.40 foot above the April stage of a year ago.

Lake Erie was 0.42 foot higher than in March and it was 0.10 foot above the April stage of a year ago.

Lake Ontario was 0.29 foot higher than in March and it was 0.53 foot below the April stage of a year ago.

Early Ore Shipments

Ore shipments from upper lake ports during the month of April amounted to 400,062 tons. Because of the late opening of navigation in 1934, no shipments of ore were made in the month of April that year. The movement in April, 1933 was 83,210 tons.

The shipments of ore by rail from Lake Erie ports during the month of April was 474,041 tons, as compared with 416,225 tons for the month of April, 1934. On May 1, 1935 the balance of ore on dock at Lake Erie ports was 4,173,204 tons as compared with 4,570,626 tons on May 1, 1934.

Coal Shipments Heavier

Coal shipments on the lakes this year so far have been considerably heavier than for the same period last year, partly due to the earlier opening of navigation. Bituminous coal shipments from Lake Erie ports from the beginning of the season up to 7 a.m., May 13, in short tons, amounted to, cargo, 4,829,255, bunkers, 121,075, total, 4,950,330.

This represents an increase of 1,611,186 tons over the same period last year; an increase of 2,164,354 tons over the same period of 1933; and an increase of 2,770,247 tons over the same period in 1932. These figures have been prepared by the Ore & Coal Exchange, Cleveland.

Vessel shipments of anthracite coal on the lakes for the season up to May 1, 1935 amounted to 60,662 long tons. For the same period in 1934, the amount was 37,471 tons; for the same period in 1933, 6372 tons; and for the same period in 1932, 9113 long tons.

To Dredge Cuyahoga River

On May 16, bids were received by Lieut. Col. J. A. O'Connor, district engineer, United States engineers, Buffalo, for removing 400,000 cubic yards of silt from the Cuyahoga river. Dredging work is expected to begin immediately on receipt of a satisfactory bid.

It is planned to first open a channel to the upper river to permit delivery of badly needed supplies of iron ore and limestone to the Corrigan-McKinney and Otis Steel Co. docks, and then dredge to a depth of 26 feet in the center of the channel from the mouth of the river to the head of navigation. The estimated cost is $175,000.

Coast Guard Commander

Formerly commander of the New York division of the coast guard, Capt. William H. Shea has been appointed to succeed Capt. Herman H. Wolf, who retired April 30 after 39 years of service, as commander of the northern area which includes the Chicago and Cleveland divisions.

Captain Shea is to leave his post on the Atlantic coast on May 25, and after a month's leave of absence will report at Cleveland to take charge of coast guard activities in the northern area. Capt. H. E. Rideout, inspector of the northern area, Cleveland, who has been acting commander since the retirement of Captain Wolf, will resume his regular duties.

Passenger Service Begins Lake Vessels Ready

Anticipating a pre-depression season for 1935, the Cleveland & Buffalo Transit Co. has given its four ships the most thorough overhauling they have had in years. According to officials of the company, the cost of this overhauling will amount to $100,000.

All four vessels, the CITY OF BUFFALO, CITY OF ERIE, SEEANDBEE and the GOODTIME, have been completely repainted and redecorated. The work done includes a new main deck for the CITY OF BUFFALO, new furnaces and steam pipes for the steamer GOODTIME, and a general overhauling of the CITY OF ERIE, while 30 staterooms were torn out to make room for ten new suites and a new lounge on the steamer SEEANDBEE. The new suites will be especially attractive and will have every convenience customary in the most modern ocean vessels.

The CITY OF BUFFALO and the CITY OF ERIE ply between Cleveland and Buffalo and began operation on May 16. The SEEANDBEE is scheduled for six-day cruises to Chicago and the upper lakes, starting July 8 and continuing until Aug. 26. The steamer GOODTIME will make daily round trips between Cleveland, Cedar Point and Put-in-Bay, beginning June 16.

The steamers CITY OF ERIE and the CITY OF BUFFALO will operate from Cleveland to Port Stanley, Ont., every Saturday and Sunday during the months of July and August, making daily trips, which will not interfere with their regular night service to Buffalo. The first sailing is June 29.

Capt. Walter Pringle, manager of the Pringle Barge line and well known in marine circles throughout the Great Lakes district, was killed May 7 in a traffic accident near Port Clinton, O.

He came from a family of sailors, all licensed officers on Great Lakes boats. He was the son of Capt. Robert Pringle, president of the Pringle line. At the time he received his master's license, he was said to be the youngest captain on the lakes. He was 48 years old at the time of his death.

Advisory Council Member

Secretary of Commerce Daniel C. Roper has appointed Capt. R. W. England, manager of the Interstate Steamship Co., Cleveland, a member of the advisory council to the bureau of navigation and steamboat inspection. Captain England is the only Great Lakes representative, the remaining 12 representing ocean, gulf and inland river companies. The council will function in an advisory capacity, giving the government the benefit of the practical vessel operating experience of its members.

The Columbia Transportation Co. steamer, WILLIAM LIVINGSTONE, is being fitted with a new tank top at Buffalo.

Maritime Day is Observed Throughout the Country

May 22, designated as maritime day was initiated two years ago as a tribute to the SAVANNAH, first steamship to cross the ocean. Official status was given this day by act of congress and special proclamations have been issued each year, in connection with its observance, by President Roosevelt. Throughout the country hundreds of events were planned in connection with its celebration this year.

An event of special significance in connection with the observance of maritime day this year was the designation of the period from May 19 to May 25 as foreign trade week, sponsored jointly by the chamber of commerce of the United States and the National Maritime league. More than 200 other organizations also participated in the dual celebration which had the active co-operation of the department of commerce. The week was opened by Daniel C. Roper, Secretary of Commerce, in a radio address and was to be closed with an address by Cordell Hull, secretary of state.

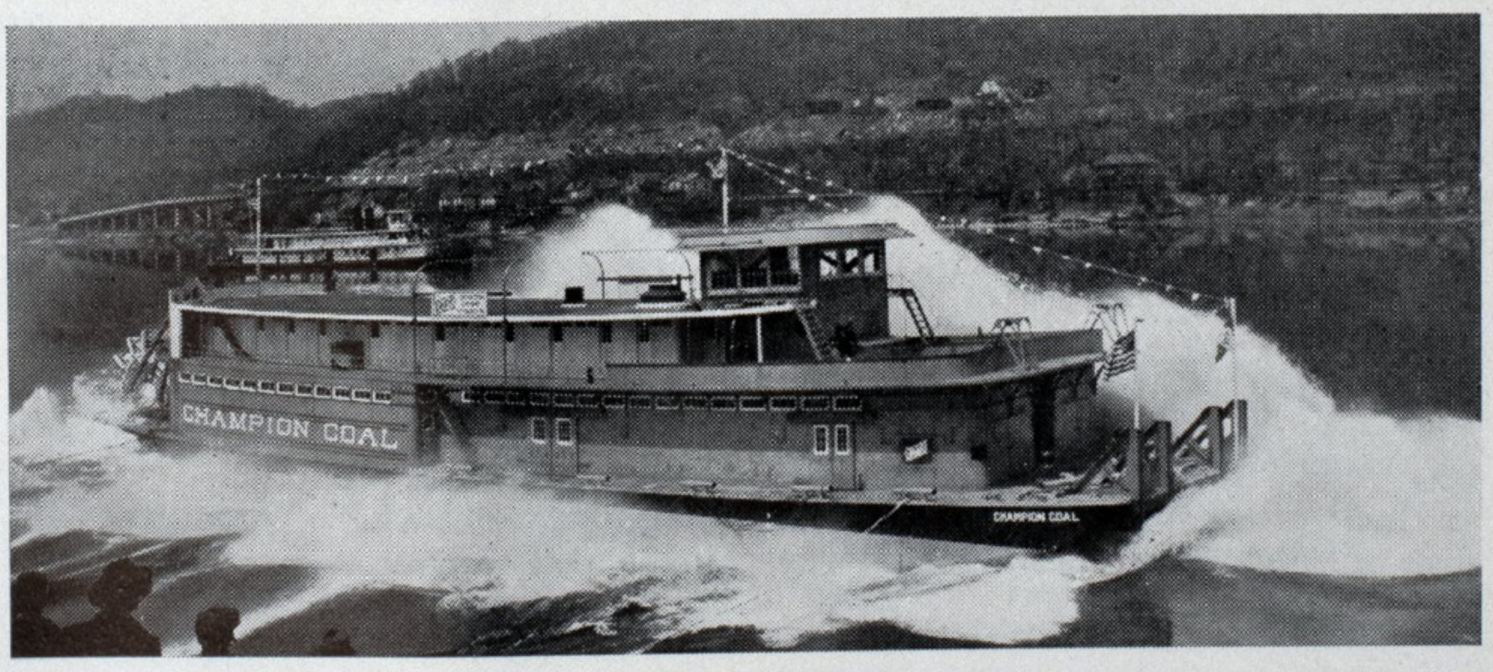
Another event of nation-wide interest in connection with its observance will be meetings of many Propeller club units at which the local winners in the marine prize essay contest, sponsored by the Propeller club of the United States, will be announced and awards made.

Champion Coal, Steam, Sternwheel Towboat Launched

ACCORDING to T. R. Tarn, naval architect, her designer, the river steamer CHAMPION COAL, launched April 23 at the Neville Island yard of the Dravo Contracting Co., Pittsburgh, is the first privately owned sternwheel type of river towboat to be constructed in that district in the last six years, and the first to be built in any yard on the western rivers within the last four years. The new vessel is being built for the Pittsburgh Coal Co. and was christended by Miss Nancy Morrow, daughter of the president of that company. Many visitors were present.

Work on this vessel began Oct. 4, last year. The cost will be somewhat more than $265,000 and she is scheduled for completion around June 1.

The hull, which is of wrought iron, measures 148 feet in length, 34 feet in beam, and 6 feet in depth. The overall length is 174 feet. The propelling machinery consists of two, tandem compound, condensing steam engines, developing a total of 800 horsepower, designed and built by the Nordberg Mfg. Co. The boiler and condensing equipment is being supplied by the Foster Wheeler Corp. Other equipment includes, heaters and evaporators, Davis Engineering Co.; pumps, Worthington Pump & Machinery Corp.; and deck machinery, American Engineering Co.



Champion Coal, steam, sternwheel, river towboat of wrought iron hull, launched by the Dravo Contracting Co., Pittsburgh, April 23

The CHAMPION COAL will operate between Pittsburgh and lower river ports. She is capable of towing from 5000 to 6000 tons.

In addition to the distinction of being the first sternwheeler of wrought iron hull built in this century for commercial river service, the new vessel embodies all of the latest marine engineering developments to give maximum operating efficiency and economy.

S. S. Washington Completes Two Years of Service

When she sailed from New York on May 8 the liner WASHINGTON commenced her third year of service in the Cobh-Plymouth-Havre-Hamburg run of the United States lines. Her two years of service have been an outstanding success, the second even more gratifying from a business standpoint than the first.

Since she left New York on her maiden voyage May 10, 1933, and in the 26 transatlantic crossings made, she has achieved a remarkable record. In these two years she has carried a total of 32,149 passengers representing an average of 1236 per round voyage. Half of these passengers traveled in the cabin class accommodation. She has steamed more than 200,000 miles.

Approximately 305 railroad carloads of mail have been transported by the WASHINGTON since she entered service. This represents a total of 243,944 sacks or, in weight, 9,576,288 pounds, the average being 9380 sacks or 368,318 pounds of mail per voyage. On Dec. 14 last year, eastbound the liner broke the mail record for five years, carrying 22,018 sacks of Christmas letters and packages. The previous all time high was attained by the GEORGE WASHINGTON in December, 1929 with 26,532 sacks.

Her crew has remained practically the same since she commenced service having had only 2 per cent turnover in the staff. Only two masters have commanded her—Capt. George Fried and Capt. Schuyler F. Cumings who is now master.

National Fire Protection Association

Marine Section Holds Meeting

A NUMBER of reports were tentatively adopted, for possible revision later, at the annual meeting of the marine section of the National Fire Protective association at the Engineering Societies building, 29 West Thirty-ninth street, New York city, May 10. Although an all-day meeting was originally scheduled, the work proceeded with such dispatch that the members were able to conclude their meeting with the morning session.

Samuel D. McComb, manager of the Marine Office of America, 116 John street, New York City was reelected chairman, and A. J. Smith, also of the Marine Office of America, was reelected secretary. Roger Williams, vice president, Newport News Shipbuilding & Dry Dock Co., New York, was elected vice chairman to succeed H. E. Cabaud, resigned. George G. Sharp, naval architect, New York, and A. J. McCarthy, manager of the International Mercantile Marine-Roosevelt Steamship Co., were elected directors for the term expiring in 1938.

Possibly the most lively discussion centered on a paper read by H. E. Newell, New York, on builders' risk in connection with repairing and laying up ships. The report recommended safeguards for vessels under construction, and repair which would involve considerable expense. A vote of opposition was registered by the New York and New Jersey Dry Dock association. Joseph W. Powell, speaking on behalf of this organization, said that the report had so many provisions that a shipbuilding company would never have time to build a ship if it observed them all.

Mr. Powell suggested that a shipowner could recover damages from a shipbuilder while the latter would be subject to suit by the underwriters. Mr. Newell explained the report was the result of three years' study, and, in his opinion, was the best that could be done. The report will remain tentative for at least one year.

J. L. Luckenbach, president of the American Bureau of Shipping, and Dr. S. H. Ingberg, of the bureau of standards, warned that safety must be tempered by the consideration of the cost.

"Many of these measures," said Mr. Luckenbach, "are tossed off easily as we recommend them, but they amount high when effected. I want American ships to go to sea as safely as those of other nations, but I want costs to be such that American ships will not be prevented from going to sea at all."

George G. Sharp presented the technical committee's report on construction and design which dealt with accommodation spaces for passengers and crew. The last report was in 1933, and as the current report suggested several marked changes, it was tentatively adopted for further consideration.

In reply to a question as to what the cost of fireproofing ships was going to be, Mr. Sharp said that it would be something relatively inexpensive. He recommended the use of metal furniture in ships and the elimination of combustible materials. He proposed that all draperies be properly fireproofed and that fire protection and alarm systems be installed in both cargo holds and passenger quarters.

Harry A. Campbell, New York, submitting the report on hazardous cargo, pointed out that the association's regulations for the stowage of hazardous commodities, published as appendix C of the regulations on marine fire hazards, pending promulgation by the interstate commerce commission of rules covering marine transportation, may now be discontinued as the commission's regulations have been published and widely distributed.

The committee's recommendation that appendix C be discontinued and that the committee now devote its attention to the investigation of combinations of materials that might prove dangerous was approved. It was brought out in this connection that though many materials are not hazardous in themselves, certain combinations of these materials are.

The newly formed committee on operation of marine terminals, headed by A. J. McCarthy, reported that they recently got out a questionnaire, as one of their initial moves, and are now beginning to receive returns. The report was purely a progress report as was also that of the committee on electrical matters, headed by A R. Small, Chicago.

The report on pleasure and commercial motor craft, submitted by the committee chairman, Alfred A. Luders, Stamford, Conn., was tentatively adopted, with provisions subject to change. The report on fire protection, submitted by E. H. Rigg, naval architect New York Shipbuilding Corp., Camden, N. J., committee chairman, also was tentatively approved.

The resolutions committee had but one suggestion to offer, namely, the holding of a meeting of the marine section in late November or December. This was taken under advisement.

Mr. Newell also submitted a report on tankers and final adoption is hoped for at next year's meeting.

The progress report of the tanker committee brought out the point that a serious hazard has developed in many ports in the use of nondescript small tank boats in harbor and inland water transportation and urged that such operations be brought up as nearly as practicable to a parity with safety standards set by ocean going tank ships. There was considerable difference of opinion as to the means of obtaining this end.

The committee on detection, alarm and extinguishing is a consolidation of five technical committees, and as the collective subject was a large one, the committee reported only on application to passenger vessels, leaving that of cargo ships and tankers for next consideration. The committee will endeavor to present a final report in 1936.

Personal Sketches of Marine Men

Henry Smurthwaite, Director, Furness, Withy & Co., in U. S. and Canada

By Ben K. Price

WELL known in world shipping circles, he is welcomed to New York as resident director of one of the leading British steamship companies.

AFTER serving in the infantry during the war, his first experience on this side was as a member of the British ministry of shipping.

HE HAS been associated with the one company for 35 years and is recognized for his expert knowledge of world shipping and trade.

HENRY SMURTHWAITE, newly appointed director for Furness, Withy & Co. Ltd. in the United States and Canada, is well known to shipping men here. For many years prominent in British shipping circles, he is recognized as an expert on shipping and trade conditions throughout the world. He has been a frequent visitor to this country and at one time shortly after the World war was identified with the company's New York office for several months.

Perhaps his first official introduction to this country was early in 1919, when he came to New York as a member of the British ministry of shipping, which played an important part in directing the movement of American troops overseas during the World war. He succeeds H. C. Blackiston who recently retired after serving the company for 45 years. Mr. Smurthwaite will have his headquarters at Furness House, 34 Whitewhall street, New York.

A veteran in the organization, Mr. Smurthwaite has been associated with the Furness Withy company for 35 years, except for the time he served his country during the World war. He was born in West Hartlepool, England, the original home of Furness Withy, and after completing academic training at Uppington college began his business career as a junior clerk in the Furness Withy company in 1900.

In recognition of his ability, he was sent in 1909 to Argentina on an important business mission by his company, which was then beginning to develop extensive shipping services to South America. He remained in Argentina for five months, returning then to London where he entered the company's chartering department. Here he soon gained reputation for his knowledge of world shipping and trade conditions.

In August, 1914, he answered his country's call to arms, and it is interesting to note that instead of joining the marine branch of the service he enlisted in the Royal fusileers as a pricate in the infantry. He participated in many major engagements in France and was advanced in rank until he became a captain. After the war, in February, 1919, he sailed for New York to become a member of the British ministry of shipping.

When his service with the ministry of shipping was completed, he joined the New York office of Furness, Withy & Co. Ltd. to take charge of the company's chartering operations, remaining in New York until the end of 1919, when he returned to London.

Mr. Smurthwaite was elected a director of Furness, Withy in 1924 and has contributed to the development of the organization into one of the outstanding shipping groups in the world, with cargo and passenger liner services operating to many parts of the world, including the Far East, South America, the United States, Canada and Bermuda.

Best known of the Furness, Withy services in this country is the Furness Bermuda line, which operates the new turbine electric liners QUEEN OF BERMUDA and the MONARCH OF BERMUDA, between New York and Bermuda; and the Furness Prince line, which operates the motor liners NORTHERN PRINCE, EASTERN PRINCE, SOUTHERN PRINCE and WESTERN PRINCE to ports on the East coast of South America; also the Furness West Indies lines, with passenger service to the West Indies, and the Furness Red Cross line with passenger service to Canada. The company is now building two passenger ships for the latter service.

In addition to directing the many services of the Furness interests that operate from the United States and Canada, Mr. Smurthwaite also will be responsible for the company's valuable hotel and terminal properties in Bermuda.

The chairman of Furness, Withy & Co. is Lord Essendon. When Mr. Smurthwaite joined the organization 35 years ago, Lord Essendon, then Frederick William Lewis, had already been appointed a director and was manager of the London office.

Centrifugal Pumps Used in Boiler Return Systems

AMONG a number of other proved applications, the monobloc centrifugal pump, developed by the Worthington Pump & Machinery Corp., Harrison, N. J., has been used with success in boiler return systems. It is a simple, reliable and low cost pumping unit.

The extensive experience of the manufacturer in the design and building of many types of centrifugal pumps of high efficiency was used in developing this monobloc pump. The number of parts have been kept to a minimum, which reduces maintenance cost. The unit consists essentially of only three parts; a casing, an impellar, and an electric motor. The casing, designed to withstand 100 pound pressure, is bolted to the motor frame, thus maintaining permanent alignment and eliminating the customary heavy baseplate. The stuffing box is of ample depth and is fitted with a forged follower. Pumps of 1½-inch size and larger are provided with a stuffing box seal. The casing is tapped at the top for priming and at the bottom for draining.

The impellar is a single suction enclosed type, cast of bronze or iron as specified. The shaft sleeve is an integral part of the impellar, an improved form of shaft protection. The impellar is keyed to the extended motor shaft, locked with an impellar nut. The impellars are highly efficient, the design being based on extensive research.

For driving the pump the electric motor, made by the Master Electric Co., has over-size ball bearings, grease lubricated. It is cool and quiet in operation with the rotor balanced dynamically and statically.

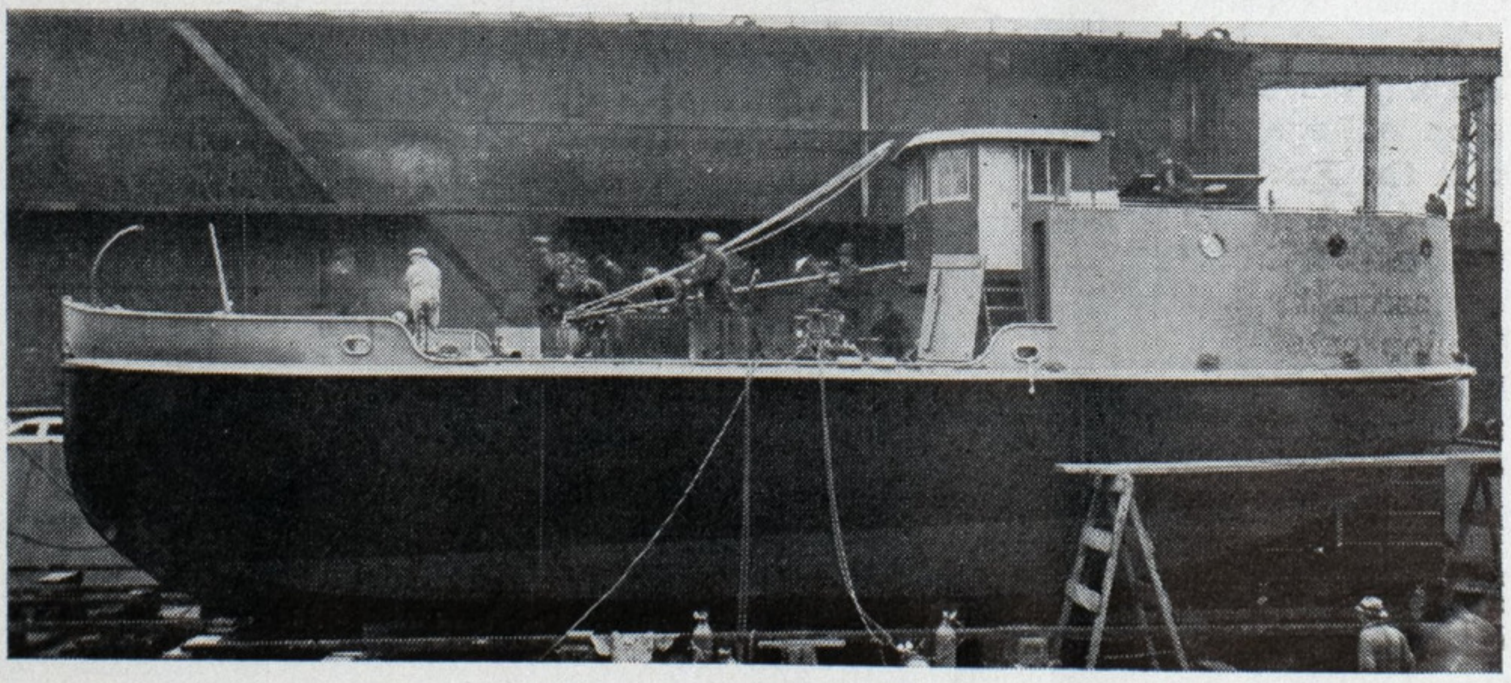
Small All-Welded Tanker Launched, New System of Construction

ON May 7, the STUDERUS, a small tanker for harbor service, was launched by floating from the dry dock in which she was built at the Crane Twenty-seventh street plant, Brooklyn, N. Y., of the United Dry Docks Inc., Truss-Weld division. She is the first all welded steel vessel built on the free flow frame system of construction which was described in the April issue of MARINE REVIEW. The principal feature of this system is that the framing is set off from the shell plating by some two inches and is secured to it by welded lugs at regular intervals.

The new vessel was built for the Studerus Transportation Co., Inc., Kearny, N. J., and is classed by the American Bureau of Shipping. She will be used for the transportation of gasoline and light oils between Sewaren and Kearny, N. J. Her principal dimensions are length overall, 64 feet, 7 inches; breadth molded, 21 feet; and depth molded, 10 feet. There is a cofferdam between the engine room and cargo tank. There are four main cargo tanks with a total capacity of 40,000 gallons. The house on the after end is 22 feet in length.

Propelling machinery consists of two Fairbanks-Morse, 60 horsepower each, 4 cycle, 6 cylinder, airless injection diesel engines, A 32-volt 600-watt direct current generator is driven from one of the main engines. For cargo discharge there is one 750-gallons per minute Viking pump, shaft connected to the other main engine. The cargo piping is 5 inches in diameter with a 1¼-inch diameter stripping line.

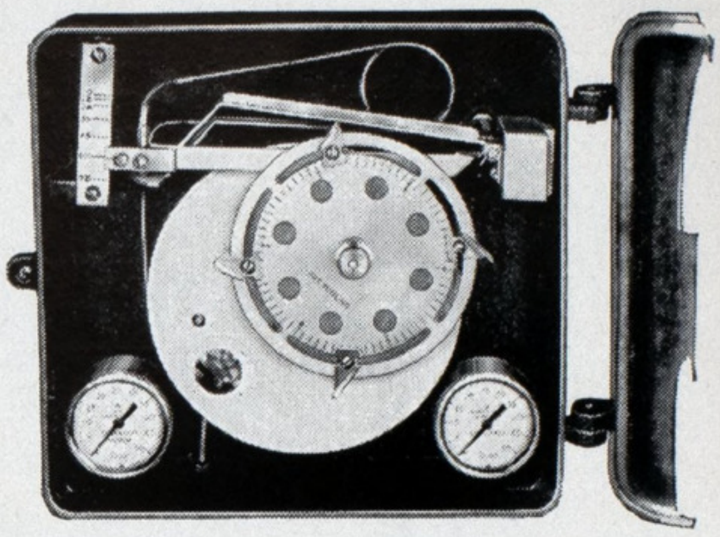
The free flow system of construction, on which this vessel was built, was invented by Johannes Kjekstad, consulting welding engineer for United Dry Docks Inc.



All-welded, twin screw, diesel, harbor tanker Studerus. Built on free flow frame system of construction by the Truss-Weld division, United Dry Docks, Inc.

New Automatic Control for Intermittent Operation

FOR automatic, intermittent operation of diaphragm valves or other similar devices Taylor Instrument Companies, Rochester, N. Y., recently developed a new intermitter as shown in the accompanying illustration. The new instrument is simple in design, adaptable and dependable in operation. It is limited to the repetition of a single operation and can be used for a variety of time schedules and operating conditions.



Control for intermittent operation at regular scheduled intervals

Instead of the conventional fixed cam, the new intermitter is fitted with a circular cam on which the proper number of actuating lugs may be placed to correspond to the number of operations to be performed. The actuating cam is driven by a powerful and accurate spring operated clock with several periods of rotation. Electrically driven clocks can also be supplied.

Wood Preservation

Wood preservation has been comprehensively treated in a booklet published by the Tennessee Eastman Corp., Kingsport, Tenn. It deals with the protection of wood against decay, dry rot and boring insects.

Those owning or maintaining docks, piers, piling, warehouses and boats will find this booklet of value. Various methods of preservation and recommendations for different types of construction are discussed. There are also many illustrations and drawings.

Copies of this booklet will be mailed upon request from the Tennessee Eastman Corp.

The Italian line general offices have been moved from 1 State street, to Rockefeller center, 624 Fifth avenue, New York City. Headquarters are in the Palazzo d'Italia which is the building reserved for Italian enterprises, forming part of the international center.

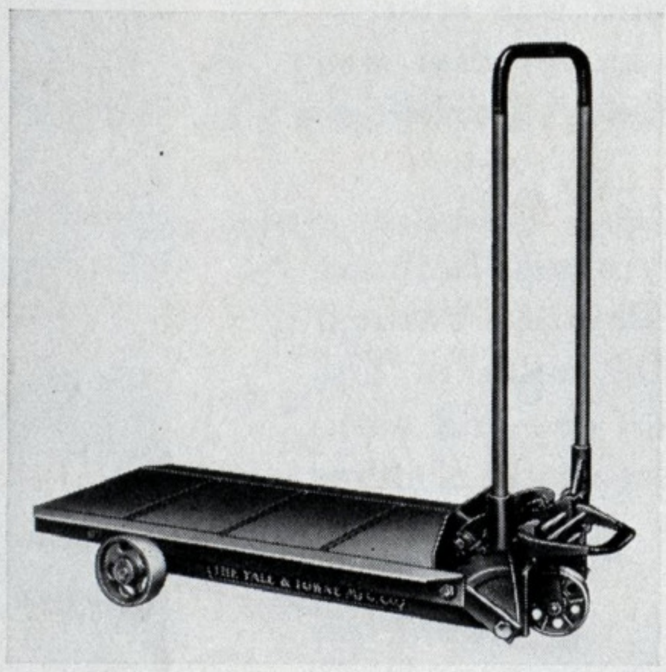
Equipment Used Afloat and Ashore

Hand-Lift Truck and Skid Platform—Anti-Skid Floor Plate—Welded Clam-Shell Bucket—Ship Fenders

THE accompanying illustrations show a new light load hand lift truck and skid platform, recently introduced by the Philadelphia division, Yale & Towne Mfg. Co.

This new hand lift truck has been developed especially for loads from 300 to 1000 pounds. It combines lightness with strength and will handle a 36 x 42 inches skid platform in a 4-foot aisle. Steering through a caster wheel permits its use in a minimum operating space.

To elevate the load the operator grasps the handle, depresses the treadle and leans back. The operator's weight by this leverage action lifts the load and the handle remains in position for operating.

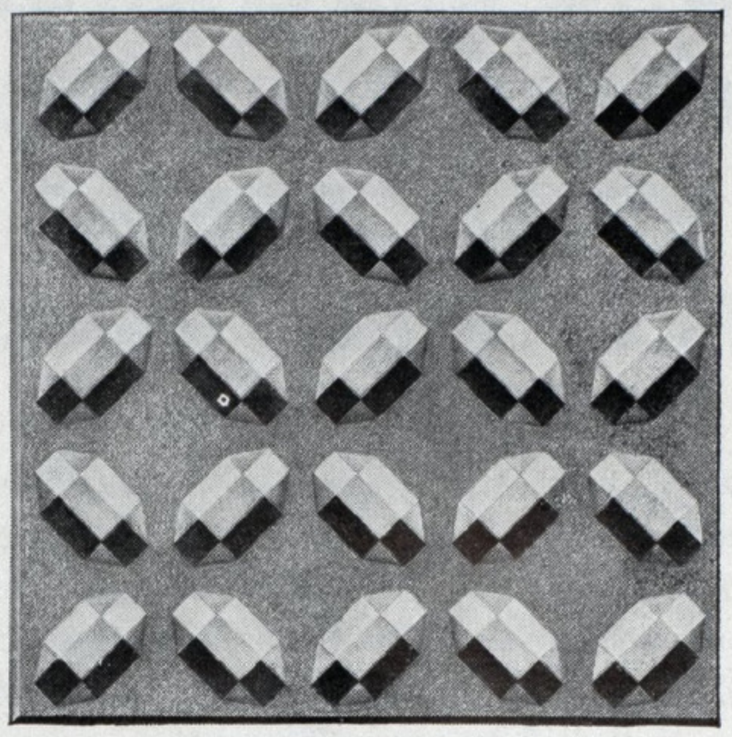


The light skid platform, which is a companion product to the light hand lift truck, weighs less than 40 pounds for a 36 x 48 inches platform. These platforms can be stacked high. The legs are welded to the deck angles. The deck lumber is of oak in uniform quality and thickness.

Anti-Skid Floor Plate

RECENTLY developed by the Illinois Steel Co., Chicago, a new anti-skid floor plate appears to be well adapted for marine service. The design of the plate was established by careful experiment to assure the highest degree of skid resistance from every angle.

An unusual feature of the new plate is its comfort underfoot, for



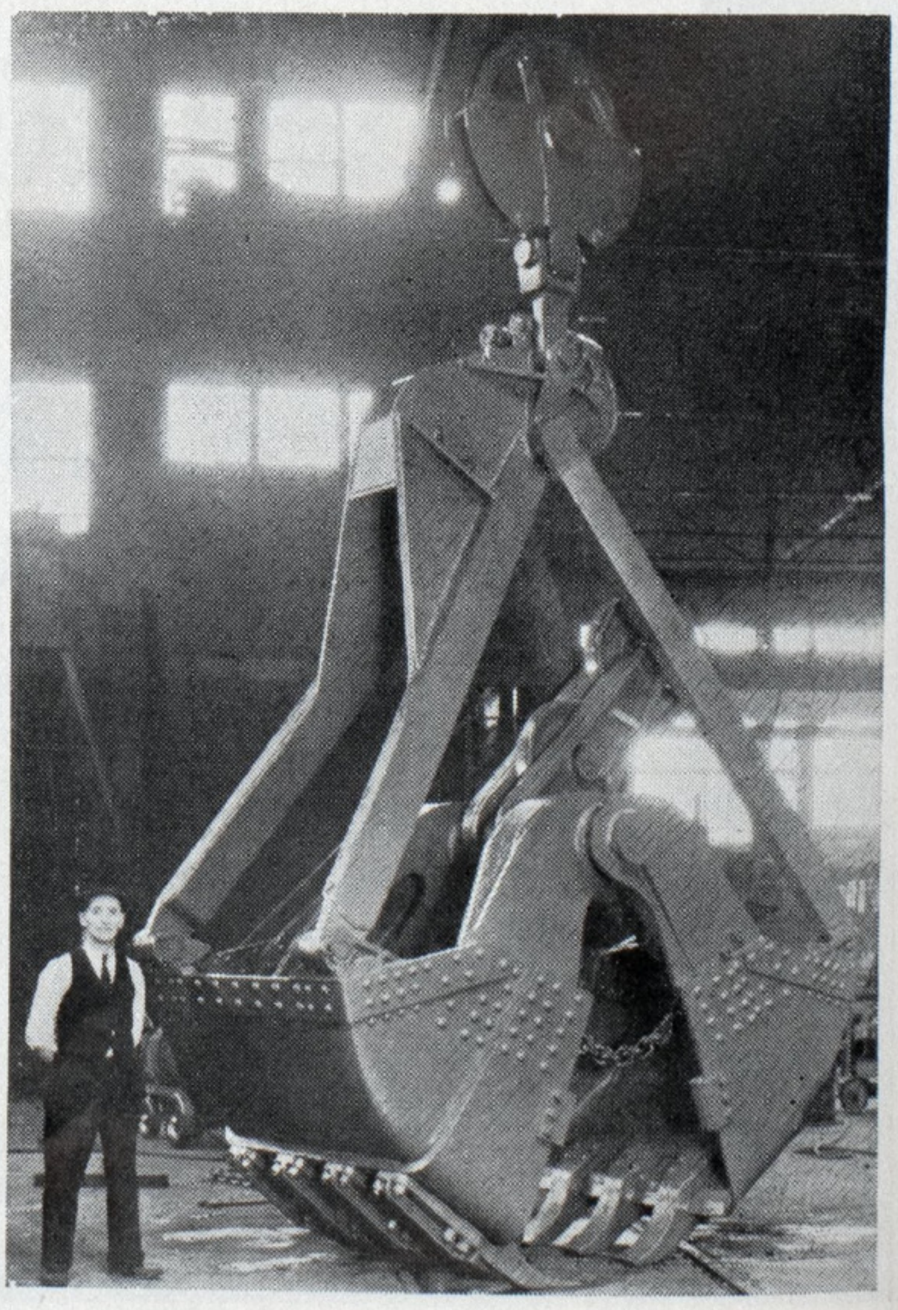
New anti-skid floor plate

while it offers a sure tread there are no sharp protruberances as all lugs have a flattened top surface.

It may be cleaned readily and drains freely. There are no pockets in which water can accumulate. Its symmetrical design as shown in the accompanying illustration minimizes waste in cutting. It comes in a number of standard weights and sizes.

Welded Clam-Shell Bucket

TO MEET severe operating conditions such as the handling of large rock in the removal of breakwaters, the Wellman Engineering Co., Cleveland, recently designed an unusually rugged type of clam-shell bucket as shown in the accompanying illustration. This is an entirely new type, heavy duty, Williams clam-shell dredging bucket. It is of 3½ cubic yards capacity and weighs over 20,000 pounds. It is constructed of welded alloy steel normalized for grain-structure. The shafting is heat treated and the teeth are of manganese steel. In service it has lifted an 18-ton piece of concrete from 15 feet of water. The welded design and the use of alloy steel made possible greatly increased strength with minimum weight, and gave a bucket structure with superior ductility and impact values than are possible when steel castings are used. Due to the high physical properties of the materials in its construction it is anticipated that the upkeep expense will be much less than in previous designs. The illustration gives an idea of the size and unusual features of construction of this bucket.



Ship Fender Developed

FOR the protection of vessels in contact with docks or other craft, a new fender has been developed and is now being introduced by Selby, Battersby & Co., Philadelphia.

The new fender made in 10 feet lengths consists of a hollow rubber tube 7 inches outside diameter by 3 inches inside diameter. The 10-foot sections are strung on a ⅞-inch steel cable in pairs. A triangular steel plate is inserted between each pair and the cable attached to the two lower corners. The top of the triangular plate is suspended by cable from the dock rings. Each installation is altered as necessary to suit local conditions.

The system is semi-rigid allowing the rubber to compress and expand under impact. It is said that the fender exerts or absorbs a force of 1½ tons per foot of length before the hollow section closes. A pressure of 50 tons per foot of length could be absorbed by this fender without damage.

Northwest River Steamer for Shallow Draft Service

The SKAGIT CHIEF, first paddle wheel steamer built in the Puget sound district in two decades, has been equipped with a unique device, the invention of Capt. H. H. MacDonald, one of her owners. This device consists of two huge wooden "spuds" or timbers, one forward and the other aft. These spuds are carried in steel castings which pierce the hull. When the craft grounds in shallow water, as is often the case, the spuds are lowered into the bed of the stream and serve as a secure anchor, preventing the steamer from being carried further into the shoals. In river rapids or on narrow bends, the spuds can be used to aid the vessel in maneuvering and turning.

The SKAGIT CHIEF, built of wood, is 165 feet long, with a beam of 40 feet, and depth of 7 feet. She draws 2 feet, 4 inches in light condition and 5 feet loaded. The paddle is 18 feet in diameter. Power is furnished by a 500 horsepower steam engine which was taken from a dismantled sternwheeler on the Columbia river. The new craft has a capacity for 550 tons of cargo and is specially designed for service on the rivers flowing into Puget sound. Her speed is 11 knots. She was turned over to her owners in April, replacing the sternwheeler HARVESTER damaged beyond repair during a storm last October.

The Copper and Brass Research association announces the removal of its office as of April 1 from 25 Broadway to 420 Lexington avenue, New York.

Hand Propelled Lifeboats Fitted on Big Troopship

BY J. G. BISSET

THIS new type of ship's lifeboat, known as the "Fleming boat," is finding increasing favor among shipowners, and is in fact fitted in the ships of over 40 great steamship companies all over the world. Three of these boats were recently used by the S. S. MONARCH OF BERMUDA, when she took 74 persons off the blazing MORRO CASTLE. The captain of the MONARCH spoke highly of their performance, and went so far as to say that with ordinary oar-propelled boats, he probably could not have accomplished the job.

As will be seen from the illustration, the lifeboat is propelled by 12 upright levers, 6 each side of the boat. The levers, acting on the fulcrum principle, move two coupling bars backward and forward, in the bottom of the boat. These coupling bars operate two cranks, which in turn, operate a mechanism known as the machine, in the center of the boat, aft. This machine is really sort of differential gear which rotates a propeller shaft, and gives the boat a speed of 6 knots.

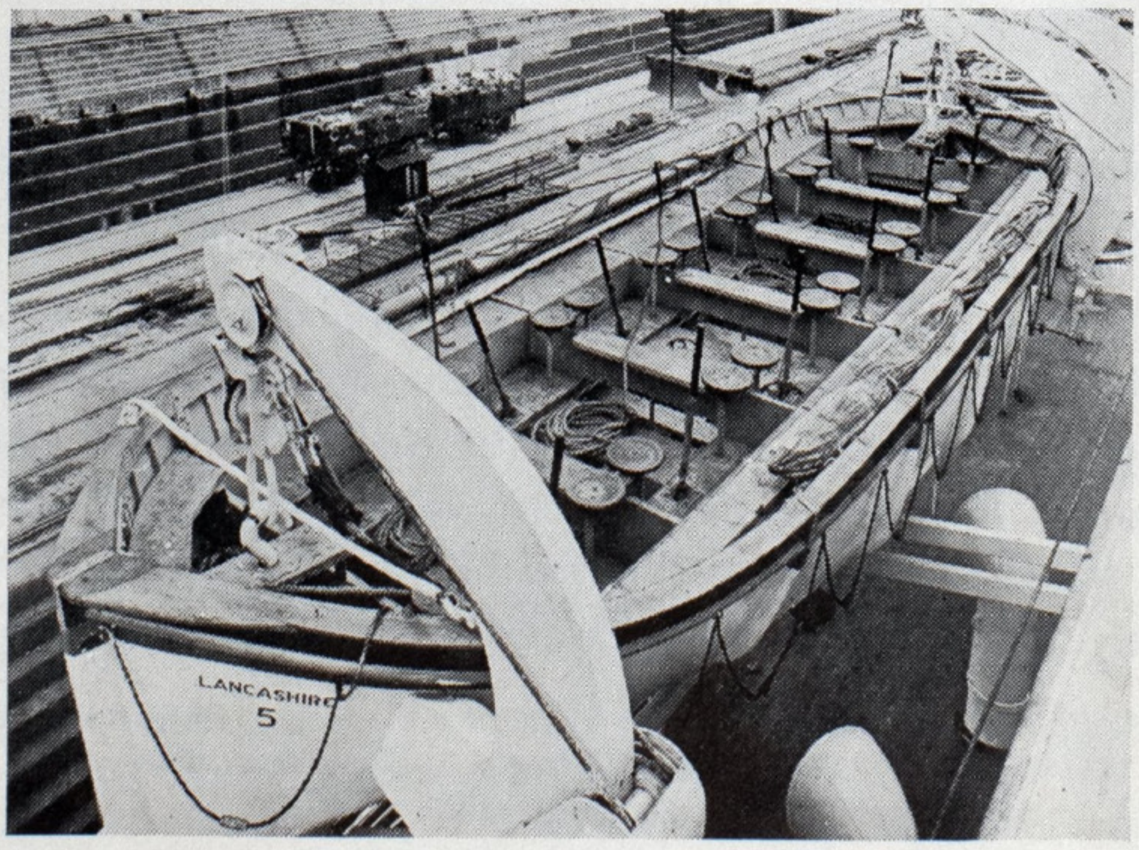
The construction of the lifeboat, with long flat sides, gives maximum space for passengers to stow themselves well into the bottom of the boat, and also allows of quick loading when the boat is held in the embarkation position. Also should the boat be subjected to severe bumping, the shocks and strains are more likely to be absorbed by the whole structure.

As may be seen, the ordinary gear, such as mast, sails and oars, are capable of being stowed in racks at the sides of the boat, well out of the way of passengers and crew. Its chief virtue, however, is that it can be moved away quickly from the side of the ship. When a ship stops to lower a boat, she naturally takes up a position broadside on to the wind and sea, and drifts rapidly to leeward, often more rapidly than a boat can pull. To push a boat off with oars and get underway under such conditions is often impossible, and usually the ship has to come astern on her engines in order to leave the boat in open water. In doing this the boat is liable to get under the ship's stem and be demolished. With the Fleming boat, all that is necessary is to work the levers, put the helm hard over, and away she goes.

Such a lifeboat requires a minimum of trained men, for she is under complete control of the coxswain and the levers can be operated by anybody, even women and children. By means of a small gear shift, the propeller can be moved ahead or astern with the propelling levers still in motion.

Lifeboats of this type have been put through exhaustive tests by the marine departments of several governments and have proved themselves good seaboats in all weathers.

One of the latest vessels to be fitted with a complete complement of 18 boats is the British troopship LANCASHIRE, carrying 1780 persons. Soldiers may not be much good at oars, but they will be able to handle the levers if required, and by working in relays the lifeboats would be capable of long journeys. This lifeboat is a British invention.



One of the 18 new type life boats on the British Troopship Lancashire. A speed of 6 knots is possible with manually operated propeller

---

H. F. Boe has been appointed assistant eastern district manager of the Westinghouse Electric & Mfg. Co., with headquarters at Rockefeller center, New York City.

At a recent meeting of the Electric Hoist Manufacturers' association, Carl O. Hedner of the Yale & Towne Mfg. Co., Philadelphia division, was elected to the office of chairman.

The judges committee for the selection of the Propeller club, national maritime day essay contest has been selected and the following have accepted an invitation to serve: Joseph B. Weaver, chairman, director of bureau of navigation and steamboat inspection; Rear Admiral George H. Rock, (CC) U. S. N., (retired), president of the Society of Naval Architects and Marine Engineers, dean of Webb Institute of Naval Architecture; and Capt. George Fried, supervisor, New York district, bureau of navigation and steamboat inspection.

Normandie, Superliner

(*Continued from Page* 15)

Opening on to the promenade deck by four large glass doors, two on each side, is the main lounge. On this deck forward is the theater and aft passage leading to the lounge. This passage is decorated with two large oil paintings of Norman maritime folk lore. The main lounge, which extends the whole width of the ship between the promenade deck, is 105 x 75 feet and light is obtained through ten large windows extending the height of the boat deck and promenade deck. It is separated from the smoking room by a large sliding door, in which are two small doors for every day use.

Walls of the main lounge are made of etched and painted glass depicting the story of navigation from its earlier days. Furniture is upholstered in tapestry.

The smoking room, 75 x 52 feet, is paneled in Coromandel lacquer of deep brown-red with gilt overlay. These panels are carved in hunting scenes. Lighting is by high side windows reaching to the promenade deck. The floor is carpeted.

Grill, Theater, Terrace

Amidships aft, a large staircase connects by successive stages to the boat deck and ends in a transverse passage, leading to the cafe grill. The grill is oval in shape and is located at the extreme after part of the boat deck, the rear wall being entirely in glass with large windows, giving a view of the sea and over the after terrace. The bar has a decorative glass counter. The dance floor of the grill is lighted by a large arabesque and luminous radial bands affixed to the ceiling and also by luminous columns in cast glass. The furniture includes chairs and tables in stainless steel.

The elevated terrace aft of the grill room occupies the aftermost part of the boat deck, with an open view over the sea. The floor is of teak as are the other open decks and is inlaid with mahogany. Benches are installed, at the backs of which are glass screens as protection from the wind. Six specially designed electric standards give the required light. Forward of the entrance hall, on the promenade deck, is the theater which can hold 380 persons comfortably, with a promenade gallery round the sides and back for standing spectators. The general tone of this room is silver.

Between the theater and the streamlined forward part of the superstructure is a winter garden, at the after part of which are two salons for reading and writing rooms. The garden is arranged with plants and flowers laid out in beds and with pergolas.

The first class sun deck, 340 feet x 70 feet, extends above the rooms described. On this deck, in the after part at the base of the first funnel is the children's playroom.

Tourist and third class accomodations are pleasantly and comfortably arranged in keeping with the general excellence of the ship throughout.

Passenger Cabins DeLuxe

Passenger cabins are spacious, well lighted, beautifully furnished and decorated and many of them are outside rooms. One of the special features of this ship are the 24 cabins each with its own private veranda, 16 x 12 feet. Some of these are in rich hardwood paneling (27 kinds of wood have been used in this ship); others in parchment inlaid with ivory and still others in engraved golden plate glass.

There are ten suites-de-luxe, in the decoration of which the foremost artists were given a free hand with a very pleasing and attractive result.

Still more elaborate are the four suites-grand-de-luxe with dining and sitting room. Two of these suites, named Trouville and Deauville, located on the sun deck will each have, for the first time on any ship, a complete open private deck, 45 x 15 feet, with a view over the sea. All of the suites are named from places in Normandy or episodes in her history.

American firms not previously mentioned who have participated in the equipment of the NORMANDIE, and their contributions are: air conditioning system in first class, Carrier-Brunswick International Inc.; carpets of compressed cork for decks, Armstrong Cork Co.; telephones, Bell system; refrigerating, Frigiaire; and, frames for winter garden windows, Kearfott Engineering Co. and Edward G. Budd.

Cost Differentials

(*Continued from Page* 17)

due to higher cost.

The American shipowner's increased operating cost, therefore, applies to 47 per cent of the total cost of operation. Should the aggregate cost of these items to the American operator be double that of his foreign competitor, his total operating cost would be 47 per cent greater. Should it be 50 per cent greater, which is without doubt too conservative, his total operating cost would be 23½ per cent greater than that of the foreigner.

In the chart, Fig. 2 (see page 17), an attempt has been made to show graphically the per cent increase in total cost of operation for any per cent (up to 100) of higher cost of any item affecting the cost of operation and for any per cent such item may represent (up to 30 per cent) of the total cost of operation. For instance, take the item of wages, if this item is 75 per cent higher on an American ship than on a foreign ship and this item represents 8 per cent of the total cost of operation, then the total cost of operation will be increased by 6 per cent. If wages represented 10 per cent of the total cost of operation the increased cost to the American operator, paying wages 75 per cent higher than the foreigner, would be 7½ per cent of the total cost of operation.

The effect in the increased total cost of operation due to the higher cost of any other item is evident at once from the diagram if two factors are known, namely: how much higher it is in per cent and what percentage it represents of the total cost of operation.

Adopting the breakdown of operating cost shown in Fig. 1, and using only those items for which there is an established and well recognized differential against the American operator, the following example may be worked out from the diagram in Fig. 2:

Assuming an equal division of insurance as between ship and cargo, insurance on the ship will represent 11 per cent of the total cost of operation. If the American ship costs 75 per cent more than the foreign ship and it is insured on the same basis, the higher cost of operation due to this item will be 8.25 per cent. Interest and depreciation, which represents 17 per cent of the total cost of operation, would, on this basis, increase the American operator's cost by 12.75 per cent. The item for wages on the basis of 75 per cent higher cost would mean an increase of 6 per cent. Similarly repairs and maintenance would increase the cost 5.25 per cent. The increased cost for subsistence would be 2.25 per cent and for stores it would be 0.75 per cent.

Adding together these increased costs: 8.25 per cent for insurance, 12.75 per cent for interest and depreciation, 6 per cent for wages, 5.25 per cent for repairs and maintenance, 2.25 per cent for subsistence and 0.75 per cent for stores, the total increased cost of operation for the American ship would be 35.25 per cent.

If it is assumed that a British cargo vessel of 7000 tons deadweight, on fairly long voyages, costs $12,000 per month to operate and the major items of expense are represented by the percentages shown in Fig. 1, the additional cost per month for operating a similar American ship in the same service, on the basis of the above conditions, would be $4230. This would mean an additional operating expense for the American vessel of $50,760 a year and this does not include any higher cost of shore staffs, rentals etc.

Marine Finishes

(*Continued from Page* 19)

enamels are the most highly recommended for super structures, white and lighter shades should not incorporate lead, since this pigment tends to gray when exposed to gases, fumes, and other conditions, particularly those found in ports shipping petroleum products or where sulphurous fumes are prevalent.

Varnishes and Their Use

Varnishes still play an important role in the finishing of various parts of ships. Their exact nature differs according to the use for which they are intended. Stair and floor varnishes are designed for extreme hardness to resist constant wear. Table and other furniture varnishes must also dry hard to avoid printing under the heat of a warm body. They must also withstand steaming hot dishes and other abuses.

Wherever natural wood finish on exteriors of ships is to be protected by varnish, as doors, rails, the bridge and other exposed parts, it is important to use only a good grade of spar varnish. Constant weathering from rain, moisture, sun heat, salt water and the vapors ever present in a salty atmosphere are a severe test on any finish. It is important that the spar varnish selected possesses the necessary flexibility and life to withstand not only these conditions, but hot and cold liquids, soap solutions, ammonia, alcoholic and other preparations.

On new wood, the first coat of varnish is usually reduced about 10 per cent with pure turpentine. Subsequent coats are applied without reduction. Old surfaces should be sanded clean and the varnish should not be reduced. Shellac is not recommended as an undercoater. These precautions taken with a good varnish will insure a smooth and durable finish that will not crack or check.

Cabin Finishes

Interior finishes for cabins, staterooms, dining and other accessory rooms are obtainable in a wide variety of colors and in flat, semi-gloss and gloss. The former produce the softer tones and avoid mirror-like reflections. Good grades will not fade or discolor and are washable. Flax or linseed oil soap is recommended for cleaning down these paints. Almost unlimited decorative effects can be obtained by the use of the flat and semi-gloss paints by stipling, glazing, or otherwise combining different colors after applying the desired foundation color. Gloss paints or long oil enamels are particularly suitable for surfaces subject to soiling, dust or finger marks. They are more resistant to dirt, wash exceptionally well and dry with a porcelain-like brilliance.

Floors may be done in clear varnish, varnish stains, or floor enamels obtainable in a variety of colors. Special floor varnishes and enamels are designed to dry rapidly and produce a tough, durable coating that is wear resisting under the most trying conditions.

Under Deck, Engine Finishes

The paint requirements of the engineering department are as exacting as those for the hull and decks. Smoke stack finishes must combine extreme durability with permanency of color. They must be able to withstand exceptional heat conditions on single or double jacketed stacks. It is well to use a full gloss material which is smoke and dirt resistant.

Because of the constant abrasion, moisture and warmth, and due to the sulphurous impurities present in coal, coal bunkers are often a serious problem. The best preservative for coal bunkers is the asphaltum or black varnish type. This paint dries to a tough, glossy surface, and if applied to a clean surface and renewed at sufficiently frequent intervals, will overcome serious corrosion troubles.

Forward storage compartments (chain, lockers, etc.) are also best treated with coatings of bituminous or asphaltum paints. These areas are subject to dampness and a lack of ventilations and light, which makes thorough protection important.

Engine room floors and shaft tunnels require the use of hard drying water-resisting enamel paints. Walls and ceilings are preferably finished in light, fume and moisture resisting gloss paints. Lighter shades not only enhance the appearance but increase the light reflection. Engines and machinery may be finished in a number of desirable colors, but only enamels specified as engine enamels should be used, otherwise discoloring and disintegration of the finish is likely to occur. Motor and other electrical windings and cables should be finished with insulation varnishes that combine penetration with good insulating properties, moisture and oil-proofness and heat conductivity.

No one type of finish is suitable for the many different requirements of commercial vessels.

Efficient painting always calls for careful selection of materials which should be properly applied on carefully prepared surfaces. The first coat especially is the most important as it is the initial effort to seal the surface underneath from the destructive action of the elements.

Development of marine finishes has taken years of research by leading paint manufacturers and these products represent the best paint knowledge to date. Where there is a question between quality and price, the best answer is that, labor is the major cost. A paint that sprays or brushes more easily, covers better and lasts longer, is certain to be the most economical in the long run.

Strathmore, Turbine Liner

(*Continued from Page* 16)

four are large boilers and two small boilers, fitted with superheaters and tubular air heaters. The working pressure at the boilers is 425 pounds per square inch, superheated to 725 degrees Fahr.

The total generating surface of the four large boilers is 29,860 square feet with a total superheating surface of 7440 square feet, the total generating surface of the two small boilers being 7170 square feet, with a total superheater surface of 2140 square feet. The air heating surfaces for the large and small boilers are 32,000 square feet, and 8000 square feet respectively.

The boilers are arranged to burn oil only, under forced draft-closed air-duct system with open stokeholds. Air is supplied to the boilers by five double inlet electrically driven fans of Howden's make.

The oil-fuel installation consists of four units, each comprising one electrically driven pump and one heater; one pair working and one pair as standby.

Two oil-fuel transfer pumps of the electrically driven two-throw type are provided, each having a capacity of 60 tons per hour, for transferring oil to the settling tanks. Soot blowers for the boilers and air heaters are of Diamond type.

Auxiliary Machinery

The main feed pumps are of Weir's steam turbine driven type, two in number, each capable of delivering 240,000 pounds per hour, against a discharge pressure of 550 pounds per square inch, through intermediate and high pressure heaters to the feed regulators on the boilers.

There are two main circulating pumps of the turbine driven centrifugal type, each capable of delivering 16,000 gallons per minute against 21 feet head, and one electrically driven auxiliary centrifugal circulating pump of "upright" type capable of delivering 1800 gallons per minute against 24 feet head.

An evaporating plant is provided for the water tube boilers comprising two Weir's vertical high pressure evaporators, each capable of providing 40 tons per day, when supplied with steam at 75 pounds per square inch.

The electric generating machinery consists of three main turbo-driven dynamos by British Houston Co. Ltd., each of 500/550 kilowatts at 220 volts.

Intercoastal Shipping Report Condemns Unfair Practices

THE United States shipping board bureau on April 29 issued the report on the intercoastal situation prepared by M. G. de Quevedo, chief examiner. This report is based on extensive hearings held at New York, New Orleans and San Francisco. Testimony was given by many witnesses including representatives of shipping companies, shippers, manufacturers, terminal companies, port authorities, chambers of commerce and traffic associations. The evidence also includes financial and statistical information, and the record fairly presents the existing situation on the matters investigated. Information was also developed regarding the chartering of vessels to shippers for the intercoastal transportation of property. The bureau has set May 25 as the time until which exceptions to the report may be filed.

The report condemns all tariffs filed by common and contract carriers in intercoastal commerce under the intercoastal shipping act of 1933, as failing to comply with the requirements of that statute. It also condemns the Shepard line's practice of naming rates lower by fixed percentages than those of its competitors; the contract rate system employed by members of the Gulf Intercoastal conference and those of the Calmar and Shepard lines; and all port equalization rules.

Denial is recommended of the request of interests in Oakland, Calif., to find unlawful the extending to Sacramento, Calif., the same rates as are given by intercoastal carriers to Oakland, on the ground that points on shallow water are not entitled to the same rates as points on deep water. The examiner points out that the law does not distinguish between these two classes of ports and that the amount of the rates cannot be measured by the depth of the water.

In condemning the tariffs filed with the shipping board bureau, the report calls for the filing of new schedules to show, among other things, the specific terminals between which rates apply; all storage, handling and other terminal charges; and all absorptions and allowances made by the intercoastal carriers.

The report deals specifically with those companies who have filed tariffs for intercoastal transportation. But it points out that numerous carriers by water participating in through intercoastal routes have not filed tariffs with the department as required by law. In this connection the report goes on to say:

"However, to clear all doubt, it is well to repeat that every common or contract carrier engaging in intercoastal transportation is subject to the intercoastal shipping act, 1933, and whether made respondent or not, it is required to comply with every provision thereof. Various reasons might be urged in defense of violations of that act shown of record but they should not be accepted in respect of violations after the act has been construed by the department. Any such violation is punished by a fine of not less than $1000, no more than $5000, for each act of violation, or for each day such violation continues. Certain specific violations of the act by Puget Sound on-carriers have been set forth in this report. It should suffice to state that each such violation is punishable in the manner indicated, even though no specific recommendation is made herein in respect thereto."

The report further states: "This investigation in many respects is in the nature of an advisory proceeding and no order or orders, except in the complaint and answer cases, should be entered by the department at this time. However, the record contains full information as to each subject of inquiry, except competition between carriers operating from and to the Gulf and carriers operating from and to the Atlantic coast, and should be kept open for a reasonable length of time for such purposes as the department may deem necessary."

The report declares it to be in the public interest that the carriers operating between points on the Atlantic coast and points on the Pacific coast establish and maintain uniform rates and charges, and recommend that the carriers be allowed sufficient time to file proper tariffs naming such uniform rates and charges.

If as a result of this comprehensive investigation and report and firm action by the shiping board bureau in the exercise of its power under the intercoastal shipping act, the chaotic and demoralizing conditions which have so long disturbed this trade are effectively removed, both carriers and shippers will benefit.

Ship Welding Code

During the past month the American Welding Society has prepared and issued a number of important codes relating to the use of welding. Among these are rules for the fusion welding of hulls and hull parts.

This part of the marine code for welding and gas cutting outlines the best commercial practice in the application of fusion welding and gas cutting to the construction of merchant ships. Copies are obtainable at 15 cents each from the American Welding Society, 33 West Thirty-ninth street, New York City.

Famous Model Maker, H. E. Boucher, Dies

At the age of 62, H. E. Boucher, noted designer and builder of ship models, died at his home, New York City, April 27. Though his work was noted for models of all types of craft, including the famous international cup defenders and many commercial vessels, his reputation was founded originally on his skill in building scale models of vessels of the United States navy. At the time of his death he was president of the H. E. Boucher Mfg. Co., and vice president of the Boucher Playthings Mfg. Corp., both of New York City.

He was born in New York City, April 24, 1873, and after graduating from Trinity college, entered the navy yard in Washington. It was here, after he had been placed in charge of the model shop, that he developed his exceptional talent in the design and building of models. He returned to New York in 1905 to enter business on his own account and soon made a name for himself for fine workmanship and accuracy, and his business expanded rapidly.

EADS JOHNSON, M. E., Inc.

117 Liberty St., New York City
Telephone Barclay 7-9390

NAVAL ARCHITECTS MARINE ENGINEERS SHIPBUILDERS

Established 1910 *Incorporated 1918*
35 Years Experience

DESIGNED and BUILT under our SUPERVISION

Tankers & Cargo Ships 5000 to 12500 Tons D. W.
Ferryboats and Lighters—Steam, Diesel & Diesel Electric
Tugboats—Steam, Coal and Oil Burning; Diesel and Diesel Electric
River Towboats — Steam, Stern Wheel; Diesel, Single and Twin Screw

Barges for Oil, Deck Loads and Derrick
Floating Dry Docks
Wood and Steel Construction

Dieselization — Valuations
Reconditioning

Coal Handling and Marine Machinery
Incorporated
92 Liberty Street Tel. BArclay 7-7964
NEW YORK CITY

Subsidy Bill Modified

(*Continued from Page* 28)

year deferred payment arrangement. This action is taken because it was felt by the majority of owners and shipbuilders that the Haag plan would precipitate government interference.

The construction and operating subsidies are separated and the Haag plan is now retained only insofar as it affects the proposed 7-year emergency replacement program.

Up to three-fourths of the vessel construction cost in a foreign shipyard may be borrowed by the shipowner at an interest rate of 3½ per cent for vessels intended for foreign trade and a reduction from 5¼ to 4 per cent as interest on construction loans for vessels to be operated in domestic trade. The differential between the cost (in the case of a vessel intended for foreign trade) here and abroad is to be absorbed by the government through direct payments to the American shipbuilder.

It is proposed that the present construction loan fund be increased to $250,000,000, the full amount authorized under the act of 1928. This is to be done by allocating for this purpose money received by the Merchant Fleet Corp. or the shipping board bureau on indebtedness

The emergency ship replacement part of the Haag plan is covered in the bill as follows:

"Provided, however, that with respect to any new vessel or vessels constructed under this title to replace a vessel or vessels which are 13 years or more of age on July 1, 1935 and engaged in the foreign commerce of the United States, and if the construction of the new vessel or vessels is to be commenced within seven years from the date of enactment of this act the authority may grant to the applicant a construction loan for the full amount of the foreign cost of such new vessel or vessels; provided further that not less than 75 per cent of such construction loan shall be repaid in equal annual installments during the first ten years of such loan contract."

No Action in House

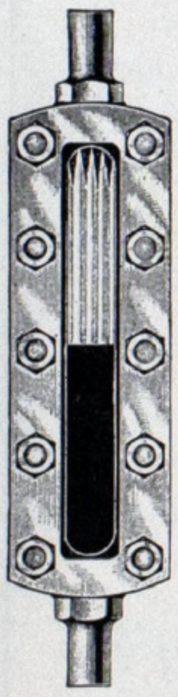
In the meantime no definite action has been taken on the new subsidy legislation by the merchant marine committee in the house awaiting the President's message on transportation. From reports, it seems apparent, however, that a majority of this committee prefers the construction loan plan suggested by Mr. Haag, rather than the construction loan proposal called for by the latest senate committee's draft of the bill.

Diesel Engine Performance In Tanker Daylight

What is said to be the world's longest non-stop voyage for a diesel vessel was recently made by the tanker DAYLIGHT, with her engines running continuously from Texas to India, and again on her return voyage to California. Despite head sea and head winds, the average speed for this long voyage was 10.1 knots.

The DAYLIGHT is owned and operated by the Standard Vacuum Co., New York. Her main engine is a 3200 horsepower Sun-Doxford diesel built by the Sun Shipbuilding & Dry Dock Co., Chester, Pa. Her two diesel generator sets are driven by 120 horsepower, Cooper-Bessemer diesel engines, built by the Cooper-Bessemer Corp., Mt. Vernon, O. More than enough fuel can be carried on board to take the ship around the world.

On arrival at Bombay, after the first leg of the voyage, when the engines were stopped, having run 51½ consecutive days and the ship had logged 12,497 nautical miles, only a few minor adjustments were required. The return trip to California required only 42 days. Including all auxiliaries, only 11 gallons of lubricating oil was used each 24 hours of service.



REFLEX WATER GAGES

Used on all types of boilers by all the Principal Navies of the world

"The Water Shows Black"

ADVANTAGES: Quick and reliable observation of the water level. Safe, sure and durable at high pressure. Not affected by cold air drafts. Most effective protection against injuries to boilers and workmen. Easily applied to all types of gage glass fittings.

When filled with WATER the Reflex Gage always appears BLACK. When empty it instantly shows WHITE. No mistake possible. This feature alone is worth many times the cost of the Reflex.

Send for catalog of Water Gage Apparatus

MANUFACTURED BY THE
JERGUSON
GAGE & VALVE CO.
WINTER HILL, SOMERVILLE, MASS.

Speed
ECONOMY
DEPENDABILITY

Every passenger, every shipper of ocean freight demands these of the carriers. Our two great fleets are known the world over for their efficiency, regularity, reliability.

Fast Freight Services To Bremen and Hamburg, also via Antwerp from outports . . . including all shipping lanes from Montreal to Puerto Mexico and from all North Pacific ports. Special low rates in transshipments.

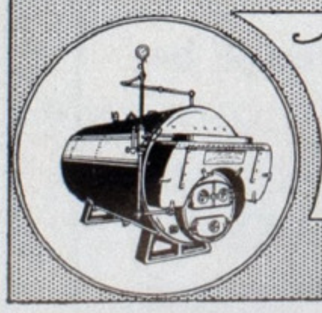
Passenger Services New York to Cherbourg, Southampton, Bremen and Hamburg. New York to Galway, Cobh, Cherbourg, Bremen or Hamburg. North Pacific Ports to Antwerp, Bremen and Hamburg, via Panama Canal.

Pleasure Cruises Around the World, to the West Indies, to Northern Wonderlands and Russia, the Mediterranean.

HAMBURG-AMERICAN LINE
NORTH GERMAN LLOYD
57 Broadway, New York, or Local Agents

CHANGE TO **TITUSVILLE BOILERS**

FOR OIL OR GAS

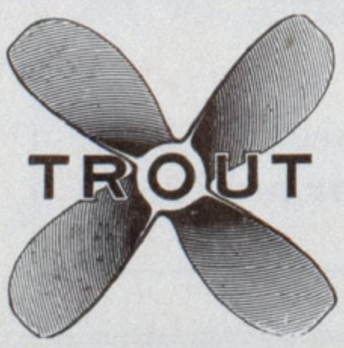


A TYPE FOR EVERY
MARINE SERVICE
SCOTCH MARINE..
DOG HOUSE.....
RIVER TYPE.....
WRITE FOR DESCRIPTIVE BULLETIN 5075-M
THE TITUSVILLE IRON WORKS COMPANY
Division of Struthers Wells-Titusville Corporation
TITUSVILLE, PA.

John J. Boland — Adam E. Cornelius

BOLAND & CORNELIUS

VESSEL OWNERS AND BROKERS
Marine Insurance Agents
Marine Trust Building BUFFALO, N. Y.



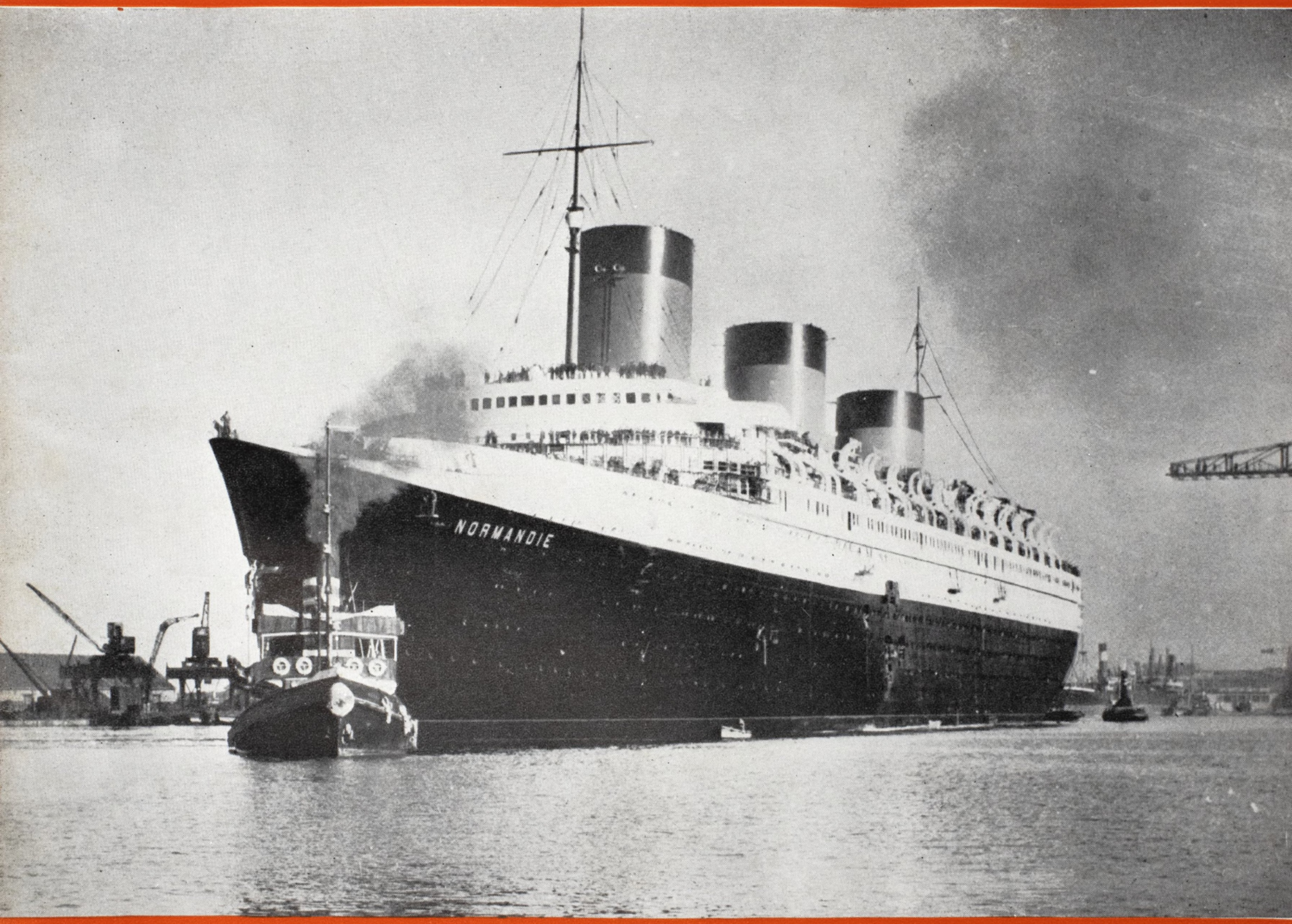
E. H. READING
PROPELLER WHEELS
Machinery Repairs
226 Ohio St.
BUFFALO, N. Y.
'Phone Washington 5361

MIDLAND BARGE COMPANY
DESIGNERS AND BUILDERS OF RIVER AND HARBOR FLOATING EQUIPMENT OF STEEL CONSTRUCTION
DUMP SCOWS
DREDGES
CAISSONS
DRY DOCKS
BARGES
TOW BOATS
DERRICK BOATS
MOTOR SHIPS
CORRECT DESIGN · SUPERIOR CONSTRUCTION
LAUNCHING WAYS OHIO RIVER AND LAKE ERIE
MIDLAND, PA.

Marine Review

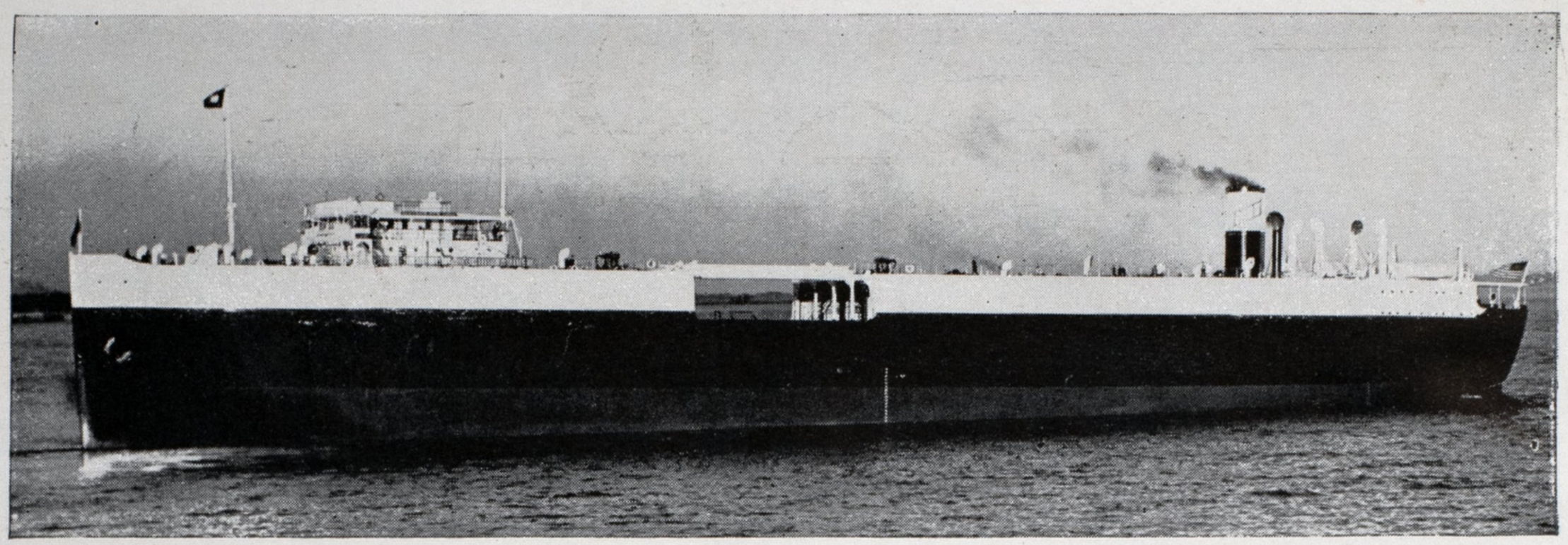
Reg. U. S. Pat. Off.

The National Publication Covering the Business of Transportation by Water



Normandie

June 1935



Seatrain Ships

Passenger Ships
Cargo Vessels
Tankers

Sun-Doxford
Opposed Piston
Diesel Engines

SUN SHIP

MARINE
SERVICE

Machinery and
Hull Repairs

Dry Docking

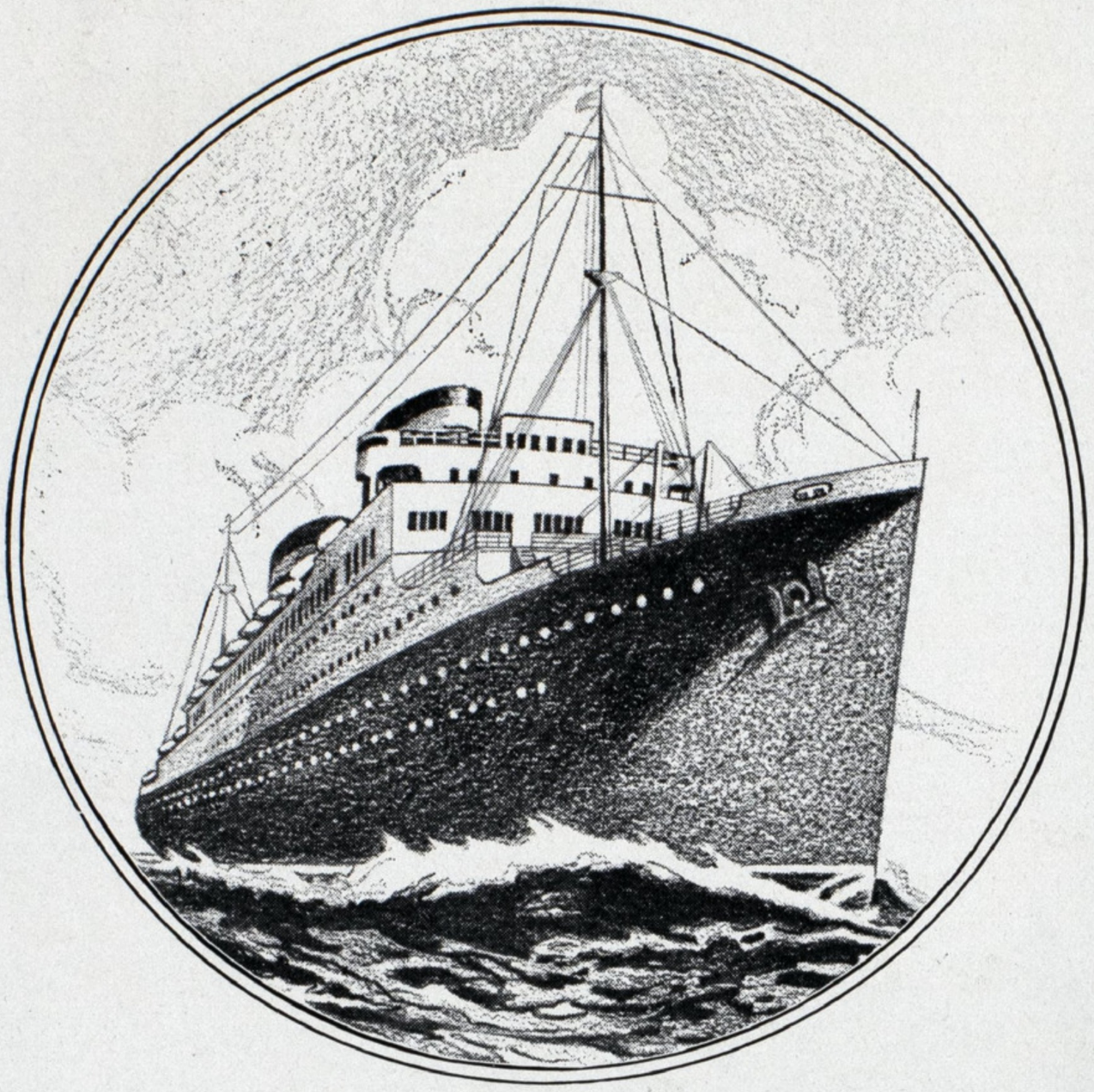
SUN SHIPBUILDING & DRY DOCK COMPANY

Shipyard & Main Office
CHESTER, PA., U. S. A.

25 Broadway
NEW YORK, N. Y.

Vol. 65, No. 6 June, 1935, issue of MARINE REVIEW, published monthly at Cleveland, O. Entered as second class matter at the post office, Cleveland, O., under act of March 3, 1879. Subscription price $3 a year in U. S.; Canada, $4; Great Britain and other foreign countries. £1. Single copies, 35c

There is no substitute for experience!



That the best work is done by those familiar with their work is conceded; similarly, equipment designed specifically for marine service will inevitably operate more efficiently and with greater economy than that merely adapted to this service in an effort to secure sales.

At no time during its existence has The Babcock & Wilcox Company offered the Marine Industry hastily conceived or converted equipment, or equipment containing inconsequential innovations, alleged to be revolutionary because of limited experience.

Instead, alert and progressive engineers of The Babcock & Wilcox Company, experienced in the problems of marine propulsion, have designed and developed efficient, practical, and thoroughly dependable steam-generating equipment that has met, and will continue to meet, every requirement of the Marine Industry.

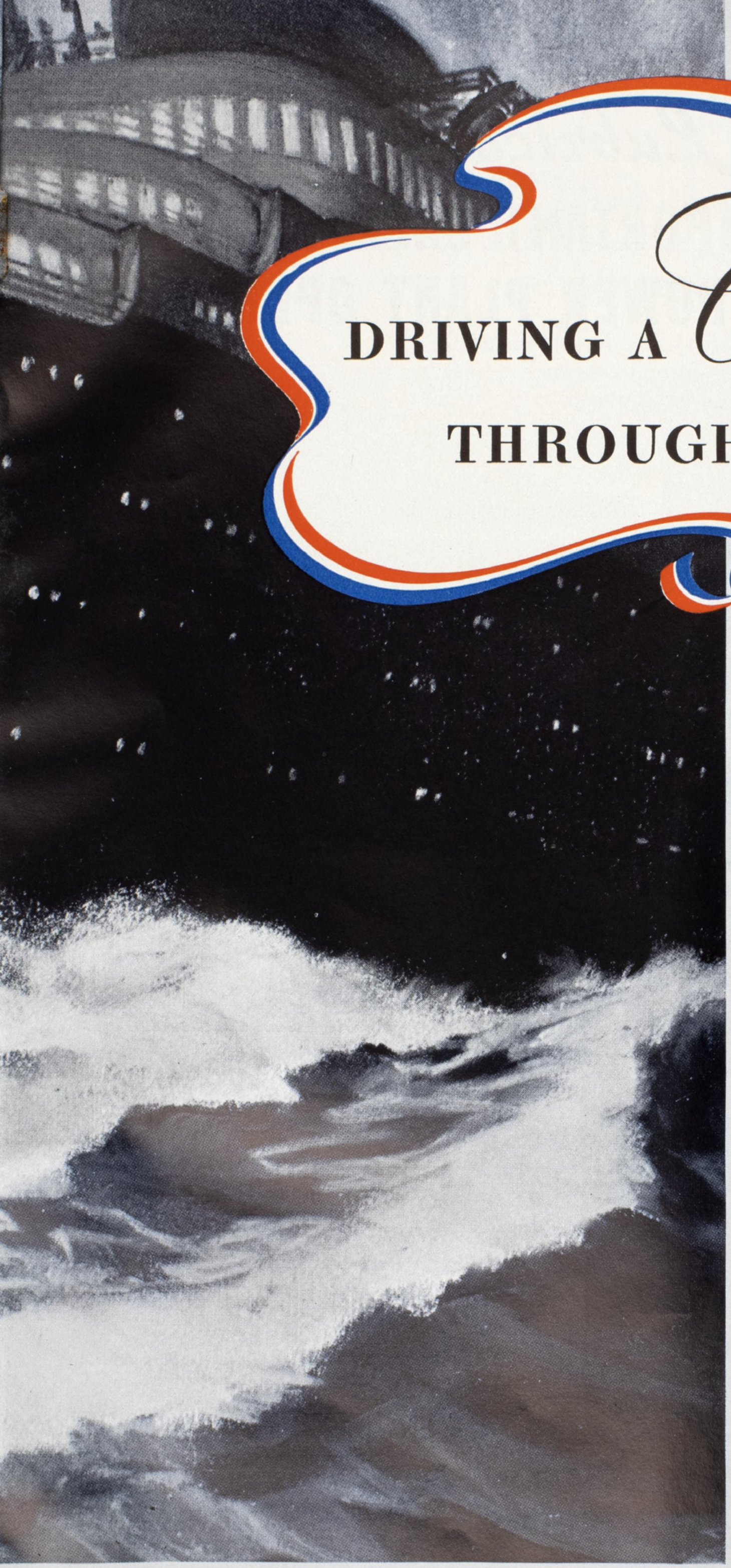
The Babcock & Wilcox Company . . . 85 Liberty Street . . . New York

BABCOCK & WILCOX

M 59

SOCONY-VACUUM OIL

INCORPORATED



DRIVING A *City of Steel* THROUGH THE SEA

New Normandie is Lubricated by Gargoyle Marine Oils

LONG BEFORE the great steel hull of the Normandie first tasted salt water, when she was still a powerless shell, her engineers perfected the intricate lubrication system for the tremendous plant that would give her life and motion . . . power to drive through endless miles of ocean.

The Normandie's propellers are turned by electric drive. Steam turbo-generators create the power which is transmitted to four huge 40,000 h.p. electric driving motors. 160,000 horsepower floats upon a film of oil less than 20/1000 of an inch thick. The Normandie, greatest single moving unit in the world today, depends upon that film of oil for speed and reliability.

To Gargoyle Marine Oils is entrusted the duty of lubricating the Normandie. For more than a quarter of a century, these Gargoyle Marine Oils have proved their value to the French Line—and today they furnish correct lubrication for the "Ile de France," the "Paris," the "Lafayette," and the "Champlain" as well as for the "Normandie."

More than half of all the merchant vessels flying the tricolor of France . . . more than half of all merchant vessels flying the Stars and Stripes . . . 35% of all the ships flying all of the merchant flags of the world are lubricated by Gargoyle Marine Oils. Socony-Vacuum Oil Company, Inc., Marine Sales Department, 26 Broadway, New York City.

COMPANY

GARGOYLE MARINE OILS

Gulf Marine Lubricants . . .

. . . AN IMPORTANT SAFETY FACTOR IN SHIP POWER PLANT OPERATION

Above is the *SS Pan America,* crack Munson liner, as she steams out of the New York harbor for her South American run. Gulf lubricants safeguard her power plant and all mechanical equipment. Below is one of the splendid Meseck tugs—a familiar sight in the New York harbor.

For these requirements:	Gulf supplies these products:
1. RECIPROCATING Steam Engines (Steam Cylinders)	Gulf Crystal Cylinder Oils B, C or D Gulf Acorn Cylinder Oils B, C or D Gulf I-C Oils B, C or D Majestic Oils B, C or D
(External Lubrication)	Tropical Marine Engine Oil R Marine Engine Oil Gulf Marine Engine Oil Gulf Harmony Oils B, C or D Gulf Security Oils B, C or D
2. STEAM TURBINES (Direct Connected)	Gulfcrest Oils A or B Gulf Harmony Oils A or B
(Reduction Gear Drives)	Gulfcrest Oils C, D or E Gulf Harmony Oils C, D or E
(Ring Oiled Bearings)	Gulfcrown Oils B, C or D Gulf I-C Oils A, B or C Gulf Harmony Oils B, C, D or E Gulfcrest Oils B, C, D or E
3. DIESEL ENGINES (Crosshead Type) Power Cylinders	Gulfcrown Oils B or C Gulf I-C Oils A or B
Bearings	Gulfcrest Oil E Gulf Harmony Oil E
(Trunk Piston Type)	Gulfcrown Oil A or B Gulf Parvis Oil M, H, A or B
4. AIR COMPRESSORS	Gulfcrest Oils C, D or E Gulf Harmony Oils C, D or E Gulf Airco Oils A or B
5. SPEED REDUCERS (Spur, Herringbone or Helical)	Gulfcrest Oils B, C, D or E Gulf Harmony Oils B, C, D or E Gulf Paramount Oils A, B or C
(Worm Gear Type)	Gulfcrown Oils B, C, D or E Gulf I-C Oils A, B, C or D Gulf Crystal Cylinder Oils B, C, D Gulf Acorn Cylinder Oils B, C, D

IT TAKES a *complete line* of oils and greases to provide for the many requirements of marine equipment. The use of just the *right* lubricant for each moving part makes power plant operation more safe, dependable and economical.

On this page are listed some of the oils and greases in Gulf's *complete line* of quality marine lubricants. You will find Gulf products the most efficient you can use. Give them a trial.

GULF

GULF REFINING COMPANY

PITTSBURGH, PA.

District Sales Offices:
Boston New York Philadelphia Atlanta New Orleans
Houston Pittsburgh Louisville Toledo

IN LEADING U. S. PORTS ON THE ATLANTIC SEABOARD, GULF OF MEXICO AND THE GREAT LAKES GULF QUALITY MARINE LUBRICANTS AND ENGINEERING SERVICE ARE AVAILABLE

22 HOURS' WELDING *prevented Shutdown...*

and Saved Two Large 42-Inch Valves

● Two 42-in. diameter balance needle valves were seriously worn in a hydro-electric plant. They were restored to perfect condition by building-up the worn surfaces with bronze. This was done without dismantling, thus avoiding a week's shutdown.

The outer rings containing the seat were removed. Local preheating was done. Two welders worked together from bottom to top of each valve without stopping. The job was finished in twenty-two hours.

More than a hundred thousand business organizations depend on welding for such jobs as this. When the work exceeds the experience of their own welding organization, thousands of them call on the Linde organization and Linde Process Service for assistance. This is readily arranged by writing, wiring or telephoning the nearest Linde Sales Office.

There are Linde Sales Offices in Atlanta — Baltimore — Birmingham Boston — Buffalo — Butte — Chicago — Cleveland — Dallas — Denver — Detroit — El Paso — Houston — Indianapolis — Kansas City — Los Angeles — Memphis — Milwaukee — Minneapolis — New Orleans — New York — Philadelphia — Phoenix — Pittsburgh — Portland, Ore. — St. Louis — Salt Lake City — San Francisco — Seattle — Spokane and Tulsa.

The Linde Air Products Company
Unit of Union Carbide and Carbon Corporation
In Canada: Dominion Oxygen Co., Ltd. Toronto

Everything for Oxy-Acetylene Welding and Cutting

LINDE OXYGEN • PREST-O-LITE ACETYLENE • OXWELD APPARATUS AND SUPPLIES

FROM PRODUCTS OF UNITS OF UCC UNION CARBIDE AND CARBON CORPORATION LINDE UNION CARBIDE

ERIE

TRUST THE JUDGMENT OF MEN WHO KNOW ENGINES . . . . . THEY SELECTED A SKINNER MARINE UNAFLOW STEAM ENGINE FOR THEIR LATEST PASSENGER FERRY

The Chesapeake & Ohio, the Pere Marquette, the Erie and the Nickel Plate railroads, with executive offices in the same building, comprise one of our greatest transportation systems. Important mechanical and engineering problems must be approved by an Advisory Committee consisting of the Chief Engineers or Superintendents of Motive Power of all four roads and headed by the Chief Engineer of the Advisory Committee.

Realizing that the Skinner Engine Company had built and was offering to the Erie Railroad Company, for a large new ferry, a prime mover that was a radical departure from past conventional design, this Advisory Committee made a most thorough investigation.

They sent marine engineers to travel on the Pennsylvania Railroad Company's S. S. "Del-Mar-Va" for several days, where two Skinner Vertical Marine Unaflow Engines had driven this ship nearly 80,000 miles in one year without a mechanical adjustment being necessary on either one and without missing a scheduled trip. Naturally, investigations were also made of other forms of marine prime movers.

They also caused an economy test to be conducted on the propulsion engine in their most recent large passenger ferry, so as to make a comparison with tests that had already been conducted on Skinner Marine Unaflow Engines.

The result of these investigations showed that the Skinner Marine Unaflow Engine, while not low in price, was the logical selection for their conditions; and the largest marine unaflow steam engine that has ever been built in America was therefore ordered from the Skinner Engine Company.

SKINNER ENGINE COMPANY
ERIE PENNA.

Save money with electric industrial trucks using Exide-Ironclad Batteries

Exide
IRONCLAD
BATTERIES
WITH EXIDE MIPOR SEPARATORS
"MIPOR," Reg. U. S. Pat. Off.

NRA CODE

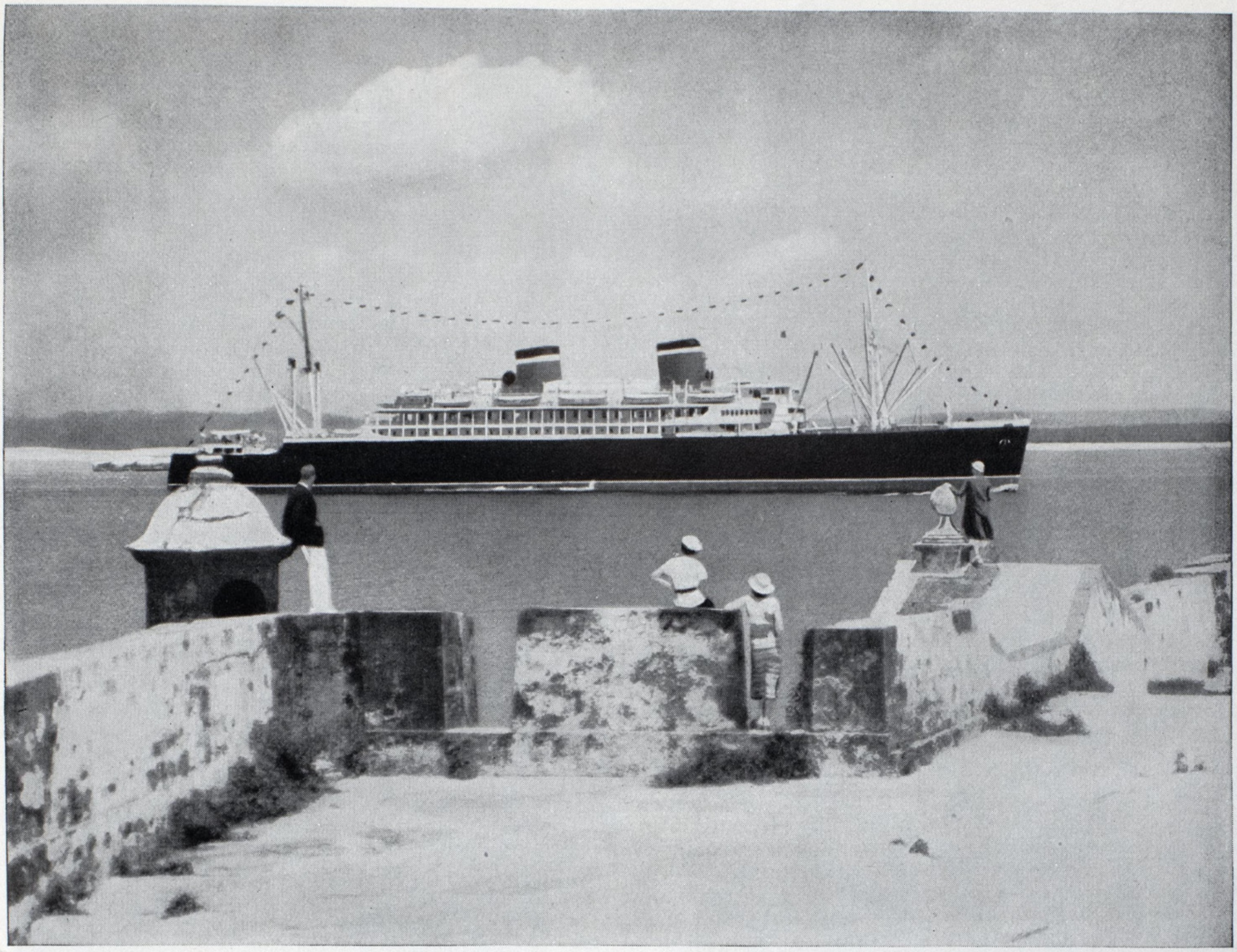
For economy, dependability and efficiency in handling materials, no other known method can equal electric industrial trucks powered by Exide-Ironclad Batteries. Operating and maintenance costs are low. Almost unlimited power is instantly available when needed. Your trucks can be kept in continuous operation, with maximum safety at all times.

As the source of motive power, Exide-Ironclad Batteries offer high power ability for heavy loads and grades. Their sustained voltage assures good speeds throughout an entire shift. Their high "final" voltage prevents unexpected interruptions in materials handling service. All of these performance features mean a saving of valuable time.

By keeping maintenance costs down, by delivering long, trouble-free service, and by their economy at the charging panel, Exide-Ironclads can materially lower your costs.

At no increase in price, they are equipped with the new Exide Mipor Separator — the permanent storage battery plate insulator that is immune to electrolyte, heat and vibration. Let Exide-Ironclads improve your materials handling service and cut costs. Write for bulletin, "The Adaptability of Electric Industrial Trucks and Tractors."

THE ELECTRIC STORAGE BATTERY CO., Philadelphia
The World's Largest Manufacturers of Storage Batteries for Every Purpose
Exide Batteries of Canada, Limited, Toronto



235 U.S. Ships Depend on G-E Turbines

HALF the American turbine-propelled cargo and passenger ships are powered by General Electric geared turbines. These 235 vessels total more than 690,000 hp.

To a great extent, the successful operation of a ship depends on the performance of her power plant. Here, above all, quality must not be sacrificed. For long, useful life of these power plants, for efficiency and reliability that mean economical shipping, for the minimum of delays, for quiet operation, specify the best in turbines—G-E double-reduction geared turbines.

As an example of modern vessels, consider the four new passenger liners built for the Grace Line and operating between New York and California—the new "Santa speedsters." Their outstanding features include advanced boiler design, steam pressure above 400 pounds, temperatures of 750 degrees.

G-E double-reduction geared turbines power these ships. G-E electric motors drive most of the auxiliaries, including the feed-water pumps. The first two years' operating results of these ships, based on displacement, speed, fuel consumption, and carrying capacity, have demonstrated that they are the most efficient of their type afloat. General Electric, Schenectady, N. Y.

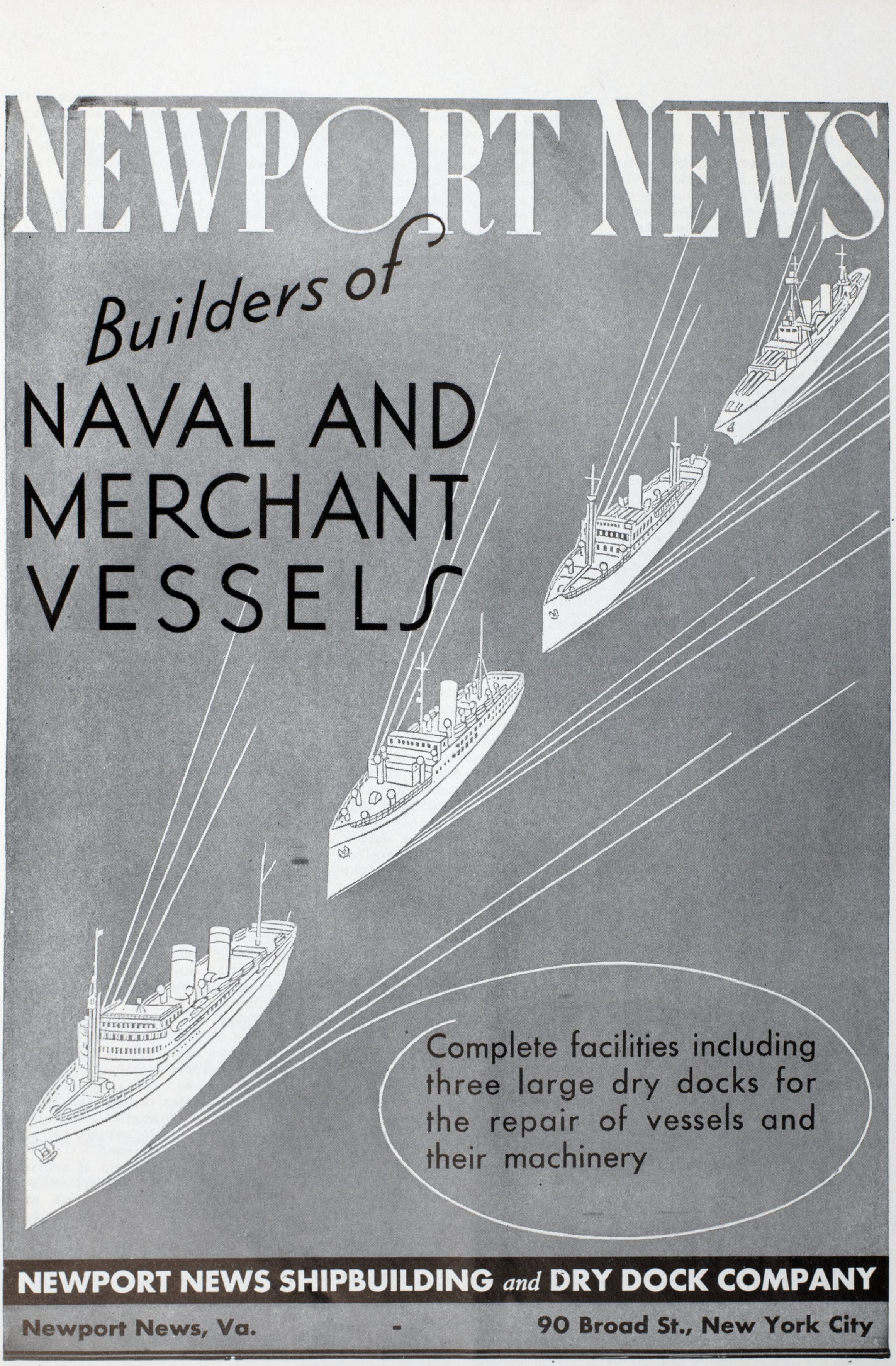
720-230

GENERAL ELECTRIC

NEWPORT NEWS

Builders of

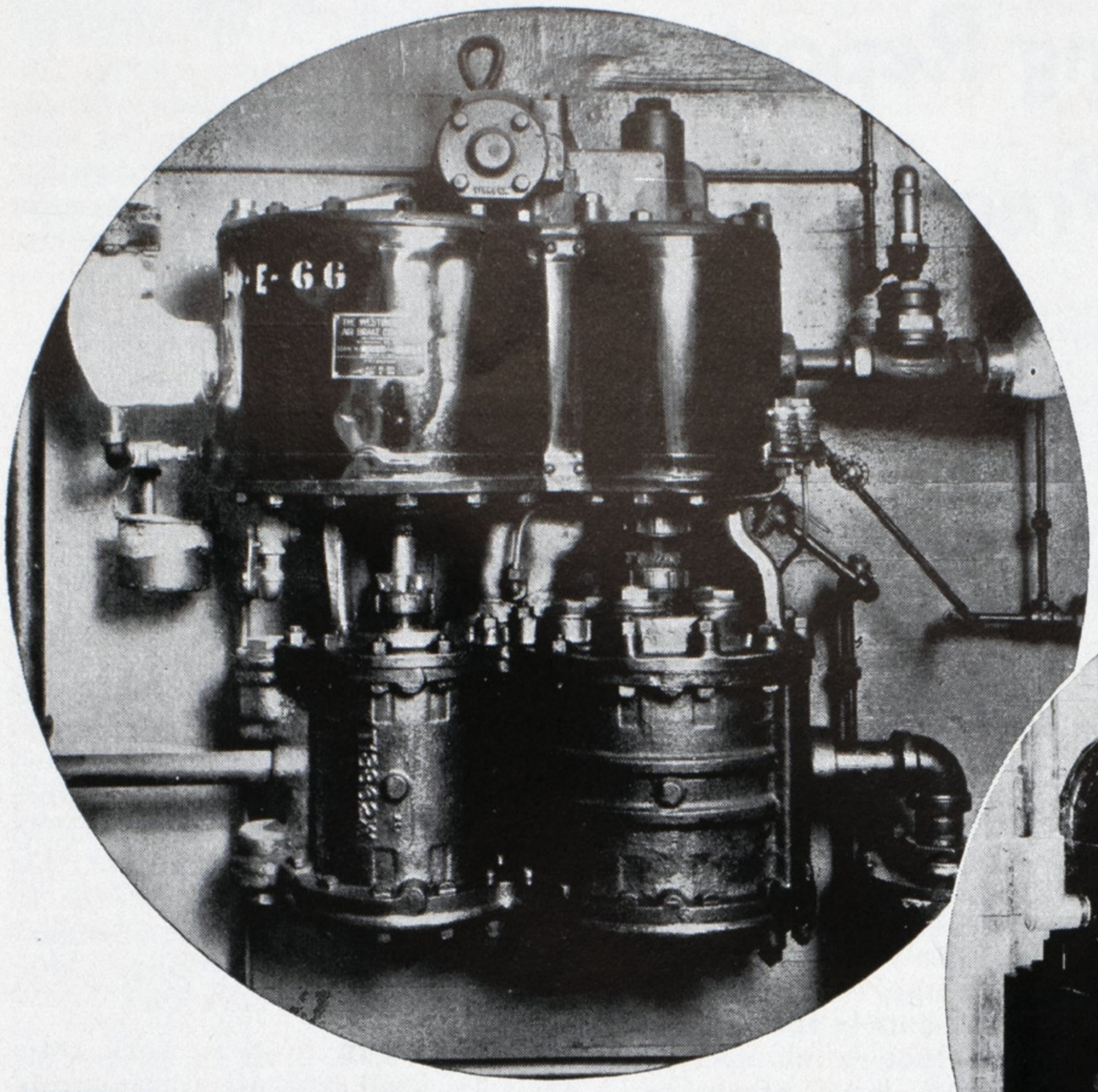
NAVAL AND MERCHANT VESSELS

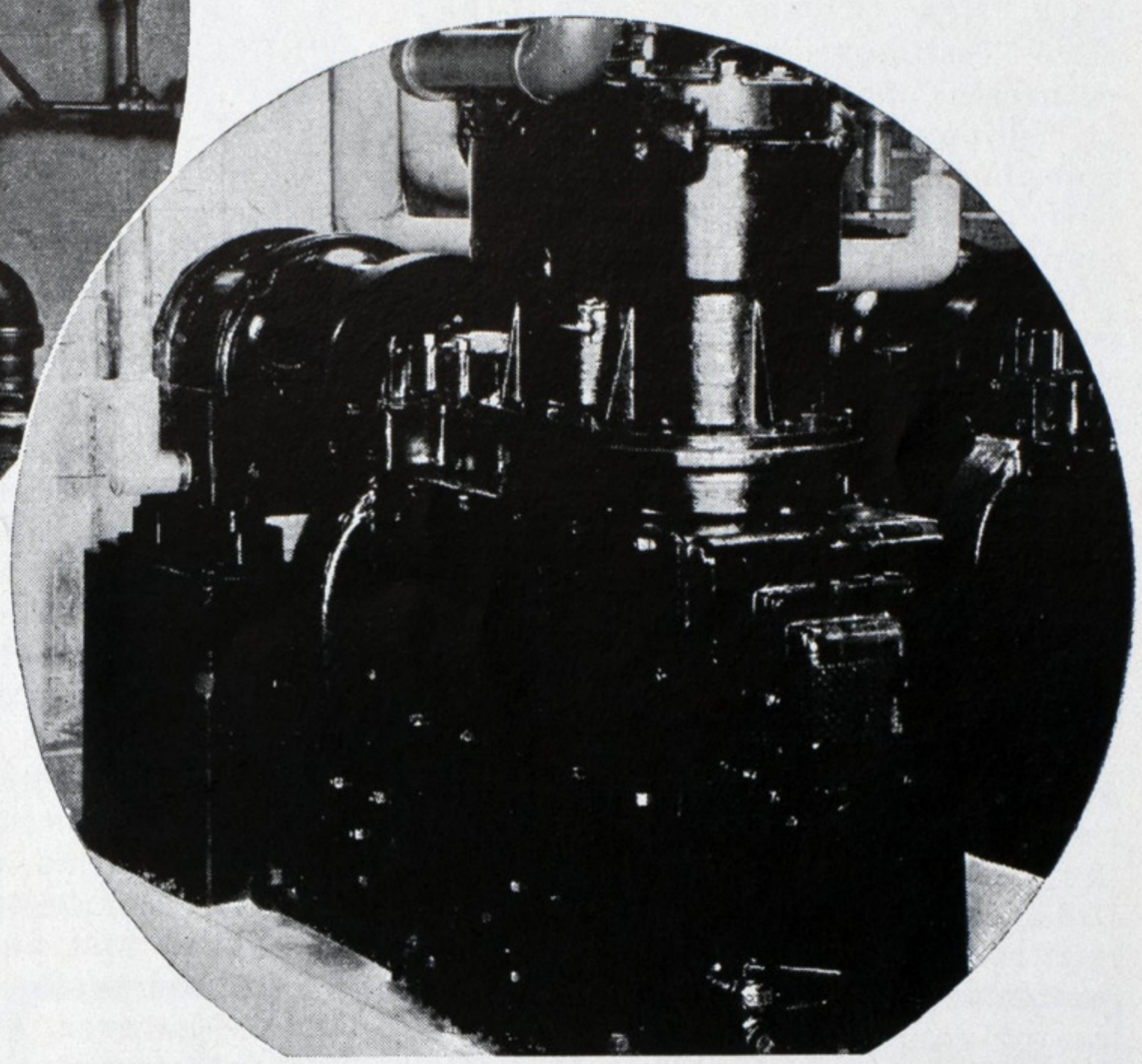


Complete facilities including three large dry docks for the repair of vessels and their machinery

NEWPORT NEWS SHIPBUILDING *and* DRY DOCK COMPANY

Newport News, Va. - 90 Broad St., New York City





WESTINGHOUSE Air Compressors Afloat or Ashore

Wherever compressed air is needed in marine service—on passenger liners for water raising systems, boiler tube cleaners or steering gear—on freighters for scaling hammers or hoists—on small craft for signal horns—on pile drivers for wood borers or saws—in light houses for fog horns—or in ship yards for pneumatic tools—there WESTINGHOUSE compressors are ideal because they are compact, self-contained, automatic, efficient, reliable, economical, durable.

WESTINGHOUSE

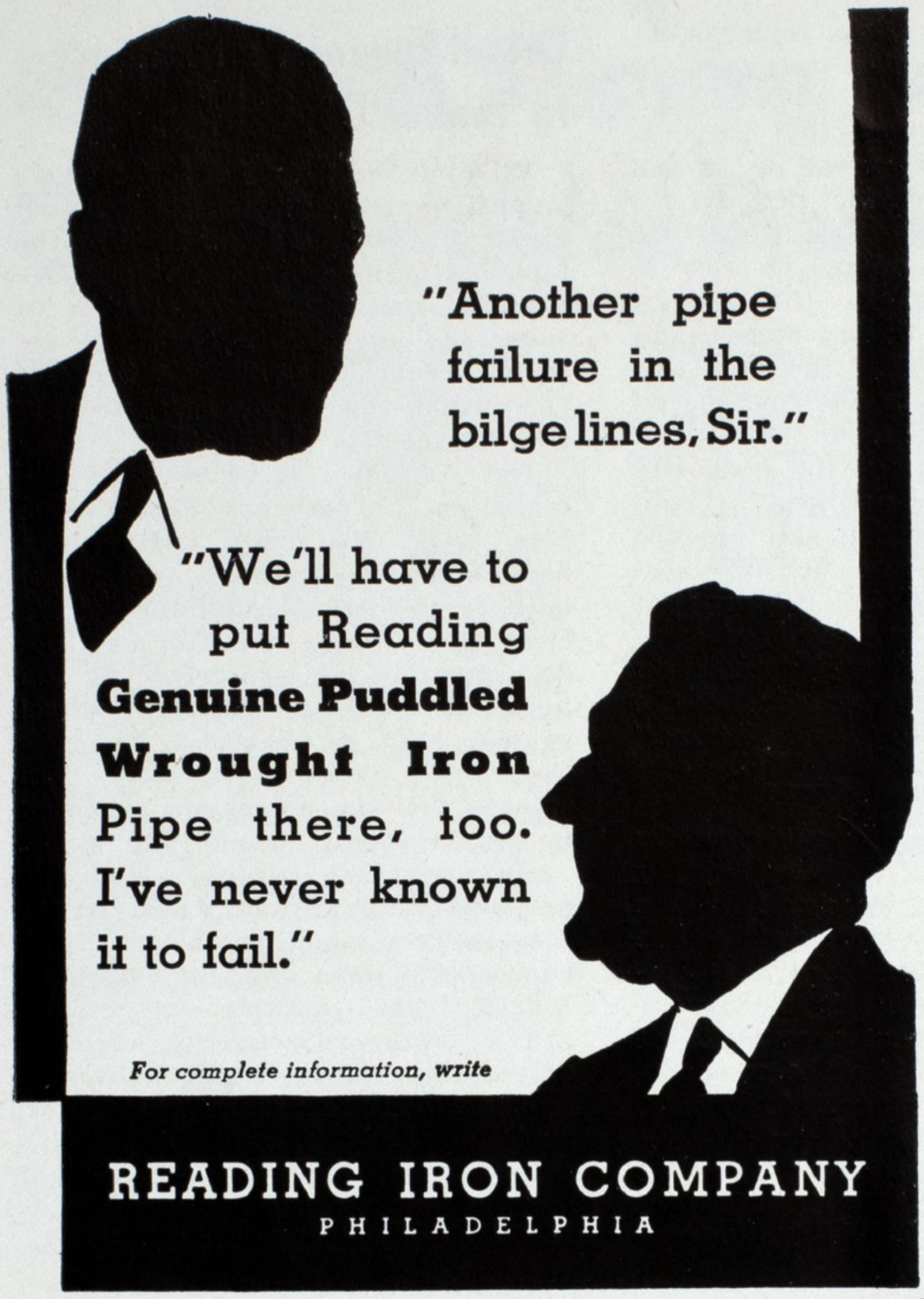
Air Compressors are available in many types and sizes ranging from 2½ to 300 cu. ft. displacement, steam-driven or motor-driven.

WESTINGHOUSE AIR BRAKE CO.

INDUSTRIAL DIVISION

PITTSBURGH, PA.

(9136)


"Another pipe failure in the bilge lines, Sir."
"We'll have to put Reading Genuine Puddled Wrought Iron Pipe there, too. I've never known it to fail."
For complete information, write
READING IRON COMPANY
PHILADELPHIA

SCIENCE AND INVENTION HAVE NEVER FOUND A SATISFACTORY SUBSTITUTE FOR GENUINE PUDDLED WROUGHT IRON

SUPERIOR!

Leading steamship companies now recognize the superiority of TA-PAT-CO Life Preservers. Filling—Private Estates Kapok—six times more buoyant than cork. Puts on like a vest—reversible both sides alike. Turns wearer on back if unconscious. Approved by U. S. Steamboat Inspection. Sold by representative ship chandlers. Prices on request.

The American Pad & Textile Co.
120 Read St., Greenfield, Ohio. New York, 16 Pearl St.

E. S. RITCHIE & SONS
114 Cypress St., Brookline, Mass.

Globe "Underlit" Compasses
and
Radio Direction Finders

Agents for the
Great Lakes, Upson-Walton Company
Cleveland, Ohio

INDEX TO ADVERTISERS

American Pad & Textile Co. 50
American Shipbuilding Co. ..... Back Cover

Babcock & Wilcox Co. 3
Boland & Cornelius 49

Coal Handling & Marine Machinery, Inc. 48

Electric Storage Battery Co. 41

General Electric Co. 43
Gulf Refining Co. 6

Hamburg-American Line 49

Jerguson Gage & Valve Co. 49
Johnson, Eads, M. E., Inc. 48

Linde Air Products Co. 8

Midland Barge Co. 49

Newport News Shipbuilding & Dry Dock Co. 45
North German Lloyd 49

Oxweld Acetylene Co. 8

Prest-O-Lite Co. 8

Reading, E. H. 49
Reading Iron Co. 50
Ritchie, E. S., & Sons 50

Skinner Engine Co. 39
Socony Vacuum Oil Co., Inc. 4, 5
Sun Shipbuilding & Dry Dock Co. ..... Inside Front Cover

Titusville Iron Works Co. 49

Union Carbide & Carbon Corp. 8
Union Carbide Sales Co. 8

Westinghouse Air Brake Co. 47

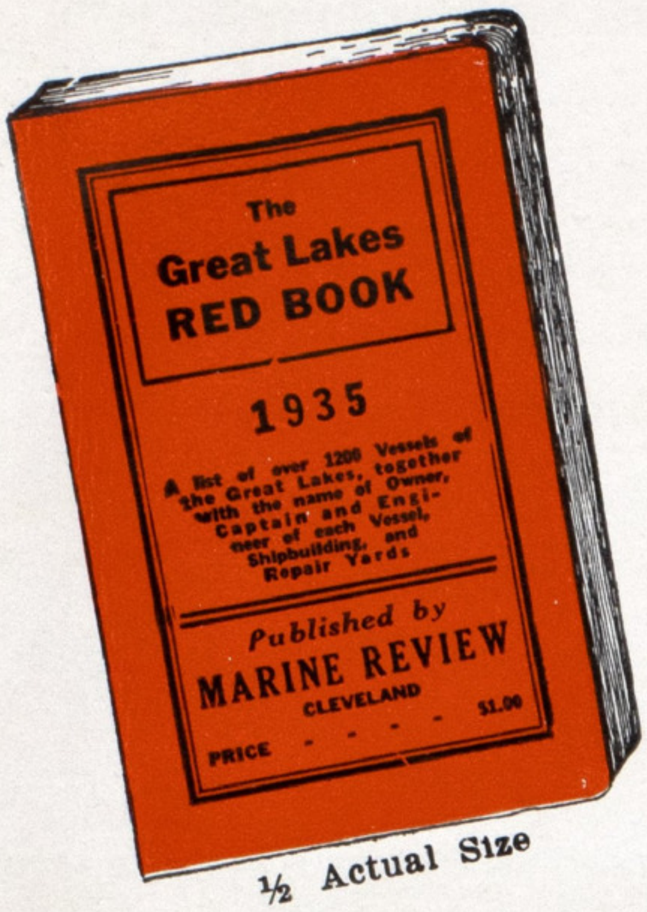
—o—

KNOWN OR UNKNOWN

Generally represents the difference between big and little business.

A known product sells with less sales effort because buyers have confidence in an advertised product. Non-advertised products are strangers to be doubted.

Don't handicap your business by failing to properly advertise your products.


The
Great Lakes
RED BOOK
1935
A list of over 1200 Vessels of the Great Lakes, together with the name of Owner, Captain and Engineer of each Vessel, Shipbuilding, and Repair Yards
Published by
MARINE REVIEW
CLEVELAND
PRICE - - - - $1.00

½ Actual Size

Announcing 1935 Great Lakes Red Book

A COMPLETE list of vessels plying the Great Lakes, with the names of the owners, captains and engineers.

Ready Now!

Contains a separate list of the ore carriers, showing the capacity of each, and a list of the supply houses, fuel docks, repair men, etc., at each port.

The Most Widely Used and Best Known Directory on the Great Lakes

It also includes an accurate and complete directory of ship building and ship repair yards serving shipping on the Great Lakes. The officers as well as the building and repair facilities of these yards are listed.

Price $1.00
Postage Prepaid

Because of its convenient vest-pocket size, *The Great Lakes Red Book* is depended upon by vesselmen and others interested in *Great Lakes* trade, as the most complete, reliable and convenient directory of its kind.

MAIL THIS COUPON NOW!

THE PENTON PUBLISHING CO.
Book Department
1213 - 35 W. 3rd St., Cleveland, O.

Date.....

Enclosed is $..... for which you are to send, postage prepaid, ... copies of The Great Lakes Red Book for 1935.

Name.....

Address.....

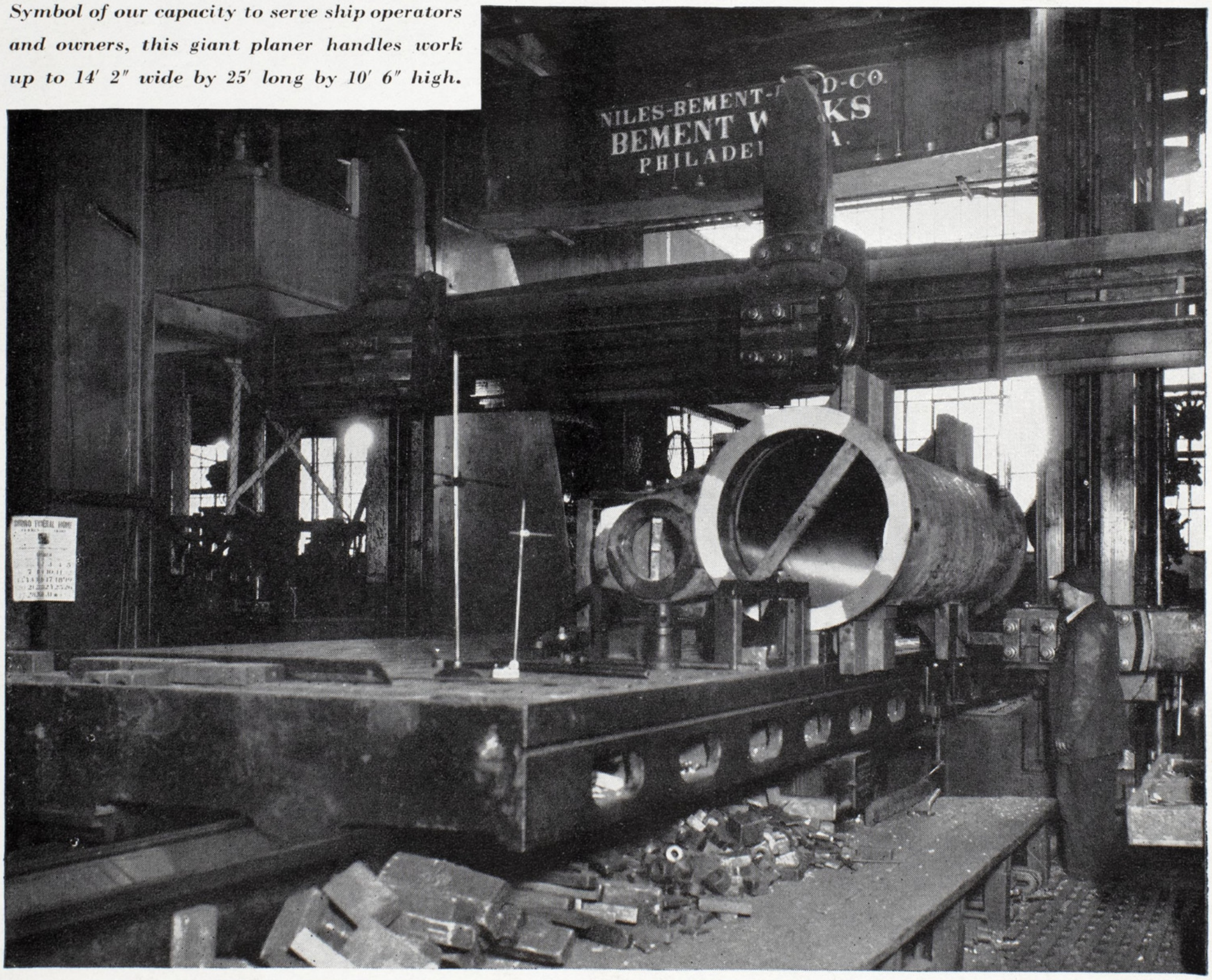
City..... **State**.....

164-M—165-M

Capacity

THE capacity of American Ship to serve you is not wholly indicated by its complete facilities for building and repairing ships—its dry docks at five strategic points on the Great Lakes—its ability to furnish anything needed, from boilers to hardware; from tank top to spare propeller blades. It goes further than that. It includes skilled and experienced manpower, guided by trained engineers and spurred on by this vital principle: The only way to do a ship job is to do it the DEPENDABLE WAY.

Symbol of our capacity to serve ship operators and owners, this giant planer handles work up to 14′ 2″ wide by 25′ long by 10′ 6″ high.



The AMERICAN SHIP BUILDING CO.

CLEVELAND	LORAIN	BUFFALO	SOUTH CHICAGO	SUPERIOR
American Ship Building Co.	*American Ship Building Co.*	*Buffalo Dry Dock Company*	*Chicago Ship Building Co.*	*Superior Shipbuilding Co.*